December 20, 1948

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STEEL

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The Magazine of Metalworking and Metalproducing

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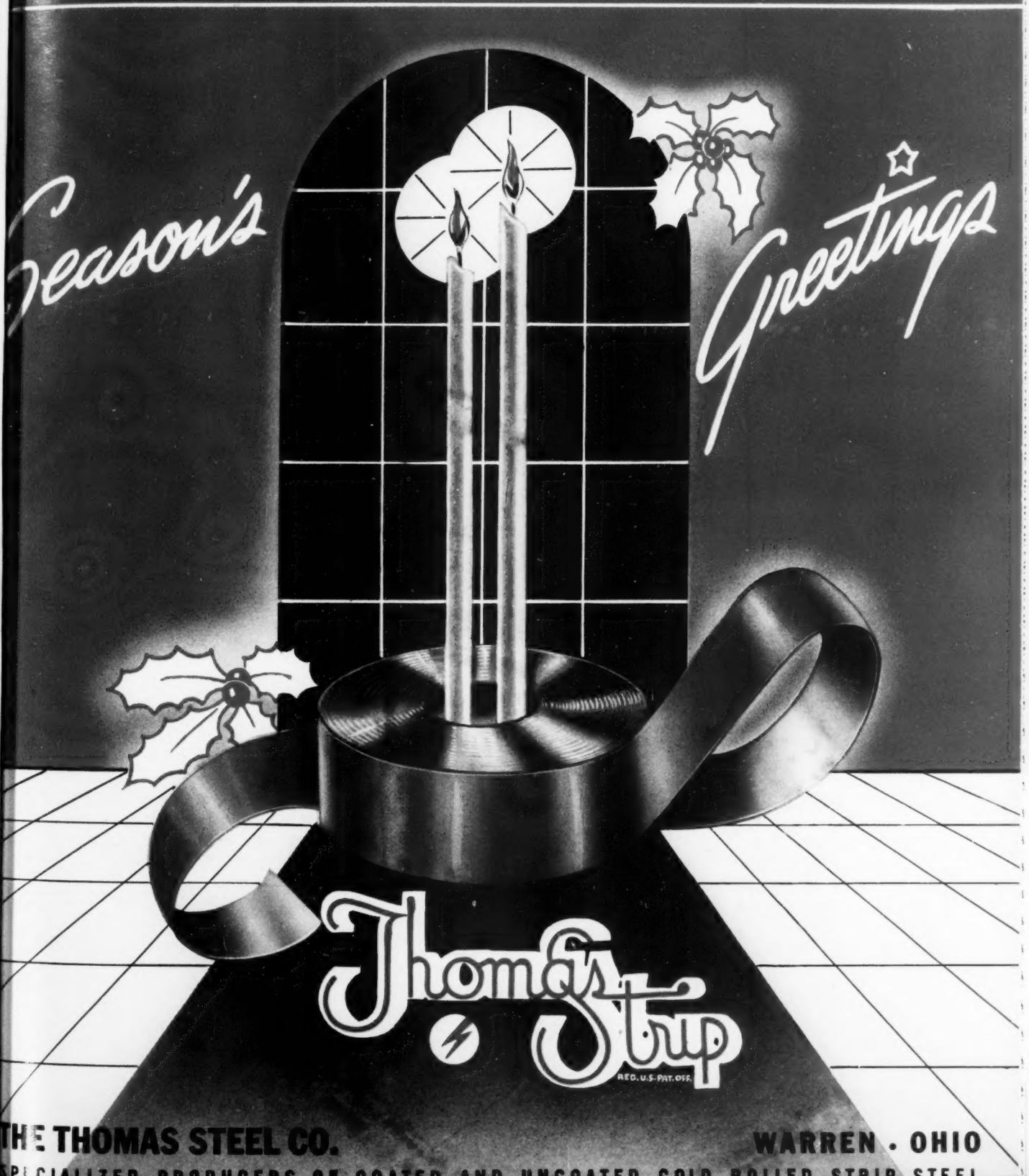

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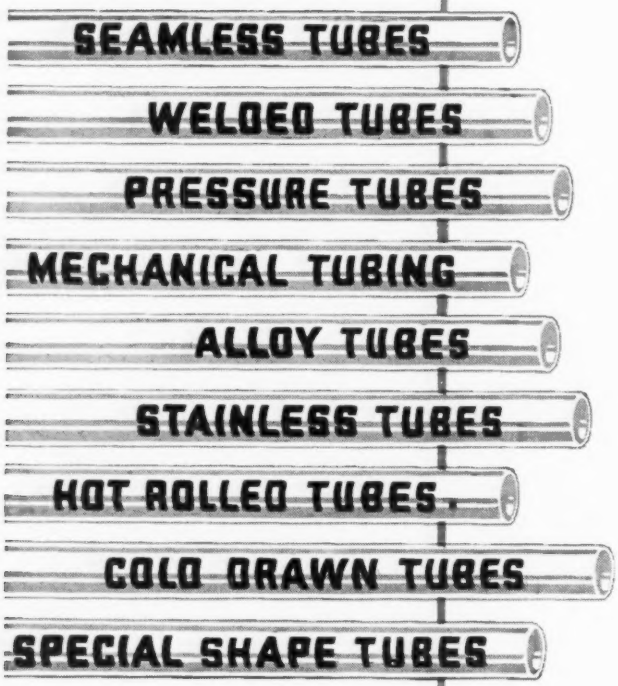

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STEEL

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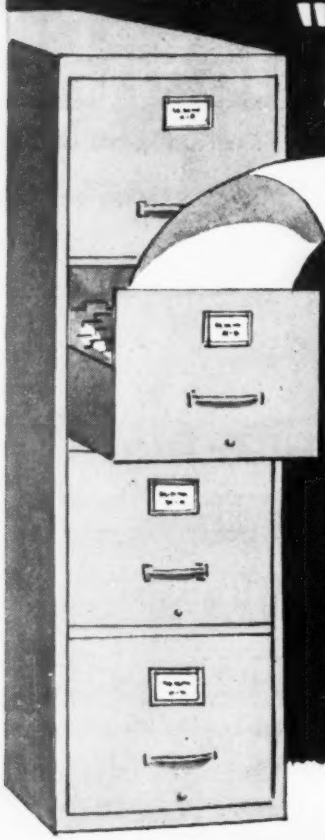

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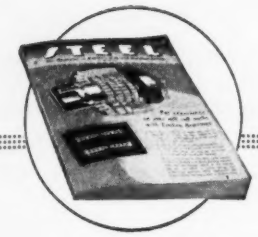

December 20, 1948

No Ceiling, No Floor

Hearings on the profits of industrial corporations now being conducted by the Joint Congressional Committee on the Economic Report will bear watching closely because they may be a factor in determining important government policies affecting business.

Thus far testimony has been sharply divided as to whether or not industrial profits are too high. Nobody seems to question the estimate that profits in 1948 will total about $20 billion, according to orthodox accounting methods. Difference of opinion centers around the extent to which reported profits are real and the degree, if any, to which they are excessive.

On the first point, most businessmen will agree with Dr. Sumner H. Slichter of Harvard University, who told the committee that total profits of industry, estimated at $12 billion in 1946, $18 billion in 1947 and $20 billion in 1948, are overstated by $16 billion. Real profits, after allowing for price inflation, would be $6, $12 and $16 billion, respectively, in the three years.

As to whether or not profits are excessive under present conditions, it is significant that the chief criticism that profits are too high comes from spokesmen of groups which in the long run would benefit much more from high profits than they would from low profits. The outcry against large profits emanates from union leaders and some politicians, who seem to think that skimming the cream off present profits would result in higher wages for workers and more taxes for the government.

It should be evident that this is short-sighted reasoning. In recent years government policy has made it increasingly difficult for industry to accumulate a cushion for the inevitable rainy day. Today, because of the inadequacy of depreciation reserves and of the dearth of risk capital, an increasing amount of money must be borrowed or taken from earnings to provide for the healthy replacement and expansion of plant and equipment.

This is no time to be talking about placing a ceiling on profits in the lush periods of peacetime. If we make this inexcusable mistake, the next step will be a floor under profits in hard times. By that time we will have traveled so far down the road to state socialism that there will be no turning back.

* * *

MAY NOT NEED POWER: Events in the next 60 days may exert a decisive influence upon the government's policy on the allocation of steel. A few changes in the existing pattern of voluntary allocations are under study and will be acted upon early in January. With or without these changes, the present plan will stand frozen until Congress decides whether it (1) will lapse at its expiration date of Feb. 28, (2) will be extended for an additional term or (3) will be superseded by some other form of allocation.

At this moment there are strong indications that the need of any form of allocation is diminishing. Several months ago Department of Commerce officials estimated that finished steel demand would exceed supply in 1949 by 10 million tons. Today the same officials estimate the shortage will be between 5 and 6 million tons. Reports from the field show that the complaints of customers arising from their inability to procure steel are subsiding appreciably. Gray market activity has slackened noticeably.

This easing of the steel shortage at home must be viewed in relation with the demands of ERP and national preparedness. European recovery is encouraging enough to warrant the

(OVER)

hope that Mr. Hoffman's administration can scale down its requests for steel for foreign account. The requirements of the armed services still are subject to day-to-day developments.

All in all, the need for power to impose mandatory allocations, as requested by President Truman, is much less pronounced today than at any time since he first proposed the idea.

—pp. 53, 54

* * *

MORE SCRAP IS VITAL: During the coming winter months, the Scrap Drive Committee of the Department of Commerce will wage its long-heralded campaign to collect a sizable backlog of ferrous scrap. It will call upon industry to engage in a thorough housecleaning, in which every possible ton of obsolete dies, jigs, tools, fixtures, equipment and machinery will find its way to a scrap pile which eventually will feed the scrap-hungry furnaces of the nation.

Operating officials of industrial plants should co-operate in this drive whole-heartedly. Their zeal should not be impaired by the fact that the scrap situation momentarily is somewhat easier than it has been in years. The long-term problem still is acute. Our nation has not even begun to restore the scrap cycle which was so important to our prewar economy.

Under the most favorable circumstances imaginable, it will be a long time before we can view our scrap situation with complacency.

—p. 55

* * *

AUTO REVIVAL ABROAD: Last month's International Motor Exhibition in London—the first held in 10 years—reflected a strong revival of activity in Europe's motordom. Of the 50 automobiles displayed, 30 were British, 6 were French, 1 was Italian and the remaining 13 were American.

In connection with the show, British Minister of Supply G. R. Strauss told his listeners that he could not offer additional hope to automobile manufacturers for more steel. He also said prospective British buyers may have to wait from 1 to 3 years for delivery. In more cheerful vein, however, he pointed out that British builders have exported more than 400,000 cars since the end of the war, many of which went to the United States.

It was noticeable that many of the new British and European cars conform more closely to American styling than did their prewar predecessors. Also it may be significant that the lowest priced automobile in the show was Ford's British-made Anglia, listed at $1240 including tax.

—p. 63

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$10 BILLION ANNUALLY: At a meeting of the Machinery & Allied Products Institute in Washington last week, two economists, approaching the problem of industry's capital equipment requirements from different angles, arrived at the common conclusion that American manufacturers should continue to invest $10 billion annually in new facilities.

George Terborgh, MAPI's research director, displayed a chart showing expenditures for capital equipment from 1870 to date. It shows expenditures for such equipment currently are 20 per cent above the trend line. It also shows that expenditures above the trend line must continue for years to make up for the deficiencies below the trend line in prewar and World War II years. Dexter Keezer stressed the need of capital investments to offset obsolescence.

Wiping out the deficiency in modern tools for industry is a major problem. —p. 59

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RUST-PROOFING METAL: Experience gained in the recent war in rust-proofing and packaging highly finished metal parts for shipment to remote spots all over the world has given impetus to the development of scientific protective coatings.

Selecting a proper rust preventive coating depends upon the conditions under which the metal part is to be stored or shipped, the length of time for which protection is desired, method of applying the coating, its drying properties and other factors. Preventive coatings are of 4 types: Grease or petrolatum, solvent, oil and plastic.

Plastic type coatings really serve as a packaging and rust-proofing operation in one. This dual role also is played by new chemically-treated wrapping papers which neutralize the corrosive tendency of moisture in the package. Some authorities think these papers may revolutionize the packaging of steel. —p. 85

Merry Christmas!

E. L. Shaner

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News Summary

HOW'S BUSINESS?— Scattered production cutbacks, moderate declines in order backlogs and increased resistance to high prices by consumers indicate that much of the postwar boom may have spent its force. Chicago purchasing agents (p. 54) see a return of competitive conditions for many manufacturers. Coal stocks have reached the surplus stage and production has been curtailed at some mines (p. 58). Steel production continues at a record pace with November output at an annual rate of 94.6 million tons (p. 54). While no general easing in steel demand is yet apparent, gray market prices are lower and a few soft spots are noted, especially in the West (p.57). Department of Commerce has revised its estimates of the steel shortage in 1949 downward from 10 million to 5 to 6 million tons (p. 53). Under these conditions, a balance in steel supply and demand before many months pass is considered possible.

PROFITS VS. WAGES— Labor leaders are studying the current profits hearings in Washington for ammunition for the fourth round wage drive (p. 56). Union spokesmen will argue that whereas wages have doubled since prewar, corporate profits have quintupled. This will be the basis of demands for wage increases without offsetting price advances. United Auto Workers appear to be gunning for Ford this year. General Motors and Chrysler have been targets of the union in previous postwar wage campaigns (p. 68).

CAPITAL EQUIPMENT—Procurement of capital equipment by United States manufacturers should continue at the current record rate of $10 to $11 billion annually (p. 59). This expectation is based on the amount of obsolescence in industry as result of low capital equipment expenditures during the depression and World War II.

STANDARDIZATION— Encouraged by their success in the standardization of internal combustion engines, the armed services are preparing to proceed with similar work in construction and roadbuilding machinery and other equipment required by the military (p. 60). One of the chief benefits of such programs is the simplification of the replacement parts problem.

ALUMINUM SHORTAGE— Demand for aluminum in 1948 is estimated at about 500 million pounds in excess of supplies, despite record peacetime output (p. 55). The leading producer has made reductions in allocations to consumers for the early months of 1949. Defense requirements are taking increasing amounts, while drought conditions in power-generating sections have reduced the amount of power available for reduction processes.

CONTINUOUS MINER— Faster mining of coal with lower labor costs and greater safety to miners is in prospect as result of the development of continuous mining machines (p. 58). Joy Mfg. Co. is the latest to introduce such equipment in a machine capable of producing coal at a rate of 2 tons a minute under optimum conditions.

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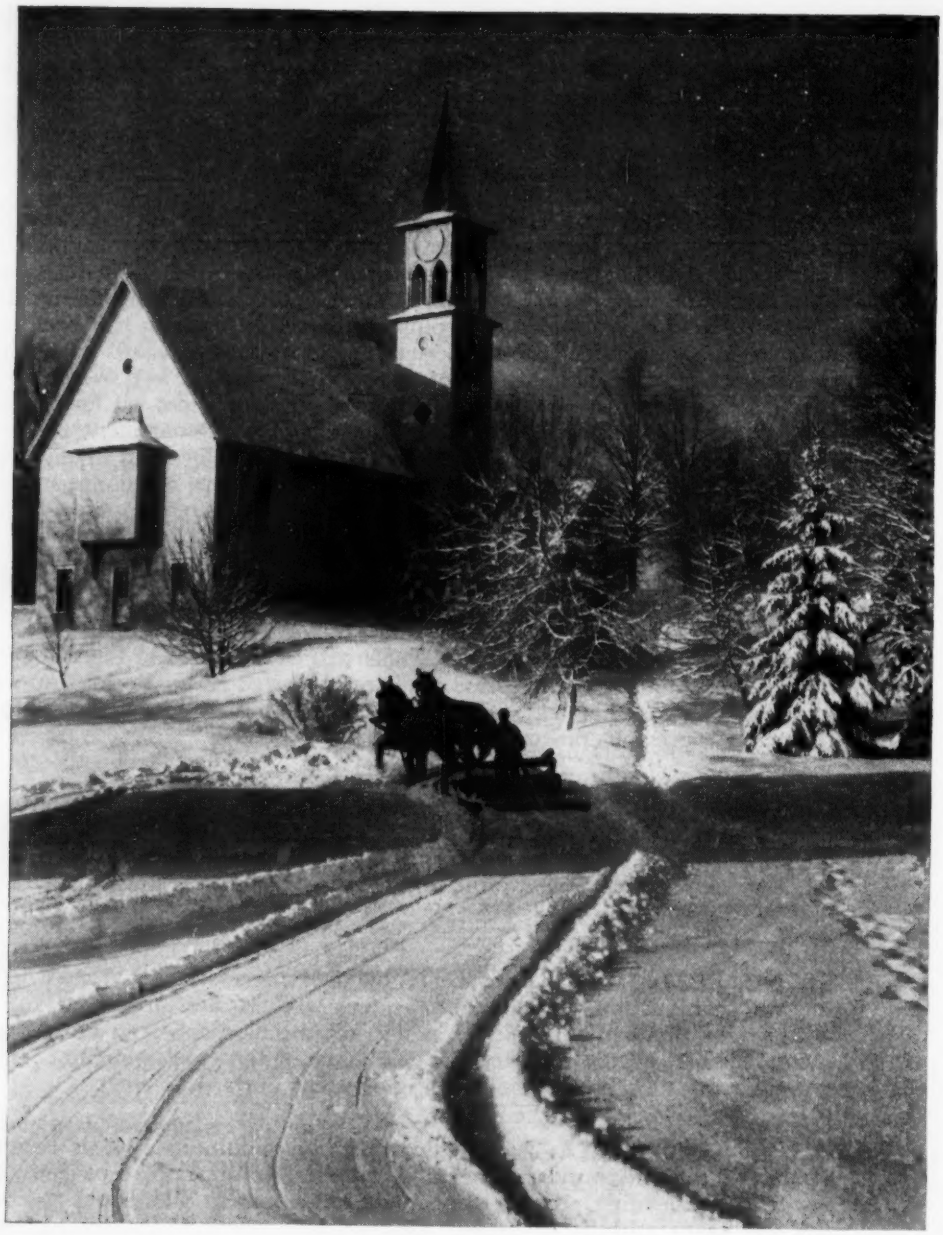

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Expect Allocation Changes

Proposals now under study to be acted on early next month, marking last proceeding under existing voluntary program until Congress determines future policy

SEVERAL changes in the existing pattern of voluntary steel allocations agreements are under study and they will be hastened to a conclusion so that final recommendations can be made to the OIC Steel Products Advisory Committee no later than Jan. 2 or 3.

That will mark the last proceeding under the voluntary agreements statute as it now stands; any further allocation decisions will be held over until such time as Congress has decided either to extend beyond Feb. 28 the authority to enter into voluntary agreements to allocate scarce materials or upon some substitute device.

Net effect of the proposed changes, if approved, will be to increase steel tonnage frozen under allocations—but the increase is not expected to be substantial. To some extent increases due to new programs will be offset by dropping some existing ones.

Need Less Pressing—In general, Commerce Department officials think the need for allocations is somewhat less than early this year. Several months ago the finished steel shortage in 1949 was estimated at 10 million tons. Today Commerce estimates the shortage next year will not be more than 5 million to 6 million tons.

Steel for Cars—In studying proposed changes in existing steel allocations pattern, Commerce officials expect to re-open consideration of the demand by the Office of Defense Transportation for more steel for freight cars. The National Military Establishment has lined up with the ODT in urging the present allocation of 250,000 tons for 10,000 new freight cars a month and for maintenance of existing rolling stock be increased.

Commerce also has re-opened consideration of the Interior Department's long-standing request for allocation of steel for more line pipe and for oil country tubular goods.

Under study also are these proposals: Expansion of the steel allocation for construction of terminal oil storage tanks; allocation of steel for maintenance and repair of bituminous coal mines; extension beyond Feb. 28 of the steel allocation agreement covering requirements of anthracite coal mines; allocation of steel for increased production of farm-type grain storage bins.

Approval of these voluntary allocations is expected within a few days: 26,400 tons monthly for mining machinery construction; additional 5000 tons monthly for inland waterways barges; additional 5000 tons monthly for merchant ships; allocation of 2576 tons monthly for cars for moving manganese ore from South African mines to tidewater. Total tonnage for the latter is in the neighborhood of 9000.

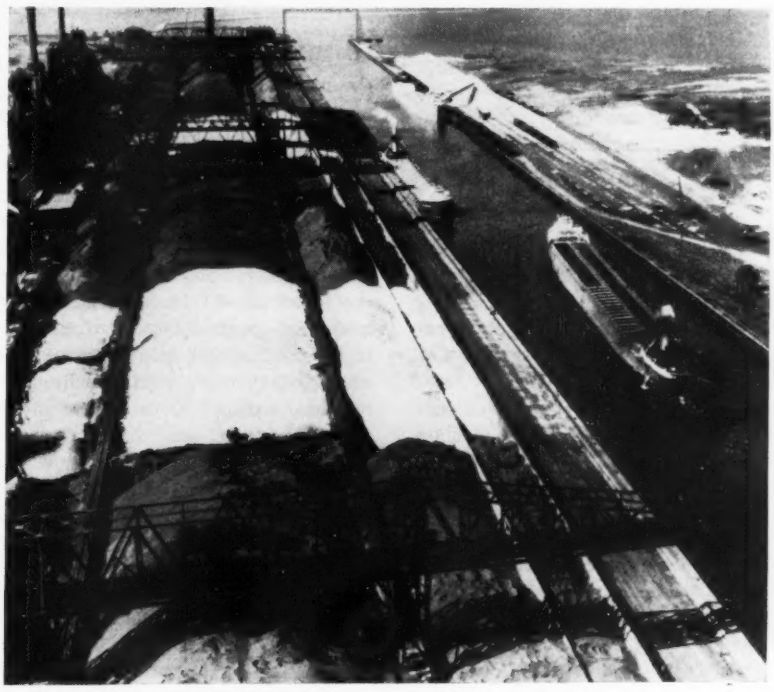
Unless Congress enacts controls to apply to components in housing construction, existing housing allocations are likely to be scaled sharply downward after Feb. 28, since Commerce officials think housing construction no longer needs present allocations assistance. Indications are allocation of 29,170 tons of sheet and strip monthly for warm air heating furnaces will be cut substantially, if not terminated. Also that existing allocation of 9830 tons of sheet and strip monthly for prefabricated housing largely will be wiped out as of Feb. 28.

Asks Export Control Extension

EXPORT and other controls authorized under the Second Decontrol Act of 1947 are needed to help check the inflationary effects of supply shortages in the domestic economy and to help fulfill our international responsibilities, Secretary of Commerce Charles Sawyer declared last week.

The inflationary potential of foreign demand has been successfully held in check, Secretary Sawyer stated in his Fifth Quarterly Report under the act.

In addition to export controls, the Second Decontrol Act authorizes export priorities assistance for tin plate and nitrogen fertilizer, and for other exceptional requirements meeting



ORE SHIPPING SEASON CLOSES: Last of the ore freighters unloaded their cargoes at lower lake ports Dec. 13 to close the 1948 lake ore shipping season. Shipments for the season totaled 82,937,291 tons, compared with 77,898,087 tons last year. Photo shows three freighters at the Gary, Ind., works of Carnegie-Illinois Steel Corp. and yards filled with ore and limestone

specified standards; domestic distribution and use controls over tin and antimony; rail transportation controls; and import controls over fats and oils and a few other commodities. Secretary Sawyer urged the controls be extended.

Car Steel Allocation Approved

CONTINUATION until next Sept. 1 of steel allocations for freight car manufacture and repair at present rates has been approved by representatives of the steel industry and government agencies. Their recommendations are subject to approval by the secretary of commerce and the attorney general.

Construction of freight cars would continue to be limited to 10,000 units a month but the matter would be left open to review later.

To attain and hold a 10,000-car-a-month rate to put the nation's railroad freight car fleet up to its most efficient operating level, the freight car builders must have more orders immediately and the necessary supplies of steel, Samuel M. Felton, president, American Railway Car Institute, New York, asserted at a hearing on the proposal to continue voluntary allocations of steel under Public Law 395.

Steel Balance Nearing?

SPECULATION as to when steel supply and demand will reach a balance is heard increasingly as result of two developments in the steel and metalworking industries.

The first is the record high production by steel mills which in November were producing at an annual rate of 94.6 million tons, about 5 million tons more than ever were produced in any one year.

The second is production declines in some steel-consuming industries which should soon be reflected in decreased demand.

To date, little indication of eased pressure for steel deliveries can be discerned. Mill representatives report customers are insistent as ever for steel and doubt balance can be achieved within the next year. Companies whose production has slackened, they say, are continuing to take their full quotas of steel, apparently to build up inventories.

Gray market transactions in steel continue active, although some reports indicate the premium demands are less than a few weeks ago.

Little easing in pressure for ingot conversion deals is noted.

It Happened Before—Despite these obvious indications of continued unbalance, buyers and sellers alike know that declining demand has shown up suddenly and unexpectedly under similar circumstances in the past. It could happen again, even early in 1949.

An increasing number of consumer items made of steel are going from deficit to surplus supply. Included now are most household appliances.

Each recent week has brought announcement of layoffs of workers in metalworking plants as result of production curtailments. While the aggregate of these is not yet large, it is causing considerable concern in labor circles, and in turn is discouraging new buying.

Production Should Continue High—Steelmakers see no reason why the present high rate of steelmaking operations should not continue well into next year. Equipment generally is in good shape and raw materials supply problems, particularly scrap, are less critical than a few months ago.

Average daily production of steel in November was the highest for any month on record and the month's output of 7,763,216 tons was a record tonnage for that month. Average output per day was 258,774 net tons.

On the basis of 11 months' production of 80,737,800 tons, greater than the annual totals for 1945 or 1946, it is estimated 1948 steel output will approximate 88.5 million tons, just slightly below 1943 and 1944.

Steel Ingot Production Statistics

	Estimated Production—All Companies									
	—Open Hearth—		—Bessemer—		—Electric—		—Total—		Calculated	Number
	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	weekly production Net tons	of weeks in mo.
1947										
1st 6 mos.	38,328,096	95.4	2,177,701	85.2	1,832,760	72.8	42,338,557	93.5	1,636,589	25.87
2nd 6 mos.	38,545,697	94.4	2,054,842	79.1	1,954,975	76.4	42,555,514	92.6	1,619,928	26.27
Total	76,873,793	94.9	4,232,543	82.1	3,787,735	74.6	84,894,071	93.0	1,628,195	52.14
1948										
Jan.	6,768,497	95.5	343,169	77.5	361,110	79.0	7,472,776	93.6	1,686,857	4.48
Feb.	6,245,338	94.3	340,596	82.3	354,270	82.9	6,940,204	93.0	1,676,378	4.14
Mar.	6,841,578	96.6	363,235	82.0	403,322	88.2	7,608,135	95.3	1,717,412	4.43
1st qtr.	19,855,413	95.5	1,047,000	80.6	1,118,702	83.4	22,021,115	94.0	1,693,932	13.00
Apr.	5,640,168	82.2	185,089	43.2	392,900	88.7	6,218,157	80.4	1,449,454	4.29
May	6,799,289	96.0	355,562	80.3	416,801	91.1	7,571,652	94.8	1,709,177	4.43
June	6,481,879	94.5	356,810	83.2	417,665	94.3	7,256,354	93.8	1,691,458	4.29
2nd qtr.	18,921,336	90.9	897,461	69.0	1,227,366	91.4	21,046,163	89.7	1,617,691	13.01
1st 6 mos.	38,776,749	93.2	1,944,461	74.8	2,346,068	87.4	43,067,278	91.9	1,655,797	26.01
July	6,346,423	89.8	324,991	73.6	395,610	86.7	7,067,024	88.7	1,598,874	4.42
Aug.	6,631,157	93.6	371,205	83.8	435,246	95.2	7,437,608	93.1	1,678,918	4.43
Sept.	6,592,226	96.3	387,153	90.5	436,231	98.7	7,415,610	96.1	1,732,619	4.28
3rd qtr.	19,569,806	93.2	1,083,349	82.5	1,267,087	93.5	21,920,242	92.6	1,669,478	13.13
9 mos.	58,346,555	93.2	3,027,810	77.4	3,613,155	89.4	64,987,520	92.1	1,660,386	39.14
*Oct.	7,118,299	100.5	409,545	92.5	459,268	100.4	7,987,112	100.0	1,802,960	4.43
†Nov.	6,910,184	100.7	411,049	95.9	441,983	99.8	7,763,216	100.4	1,809,607	4.29

* Revised. † Preliminary figures subject to revision.

For 1948, percentages of capacity operated are calculated on weekly capacities of 1,599,286 net tons open hearth, 99,962 net tons bessemer and 103,228 net tons electric ingots and steel for castings, total 1,802,476 net tons; based on annual capacities as of Jan. 1, 1948, as follows: Open hearth 83,610,690 net tons, bessemer 5,226,000 net tons, electric 5,396,770 net tons, total 94,233,460 net tons.

Buyers' Market Seen Returning

TREND toward return of competitive conditions for many manufacturers is indicated by results of the latest business survey of the Purchasing Agents Association of Chicago. At the end of November, compared with end of October, twice as many companies reported production down. Order backlogs were off also, the percentage of companies so reporting reaching the highest point since last April. With demand slipping, employment also took a drop in 20 per cent of the reporting firms. Only 14 per cent said they had more employees than at the end of October.

Buyers' Market Returning—Possibly of more significance are comparisons with results of this survey and the one a year ago. For each question, ranging from the one concerning deliveries to the overall business conditions query, the answers show a trend toward a buyers' market. Faster deliveries are obtainable; prices tend to be downward; order backlogs, production, and employment are lower.

Gray Market Prices Slip—STEEL'S spot check of purchasing men in a number of metalworking companies in the Chicago area substantiates the current reluctance to buy high priced steel, both hot and cold-rolled sheet prices having slipped substantially in the gray market in consequence.

Steel Shipments Increase

INCREASED tonnage of finished steel distributed in September provided additional quantities for the majority of consuming classifications. Reduced amounts, compared with August, went to five groups: Con-

tractors' products; oil and gas drilling; appliances, utensils and cutlery; containers; and ordnance and other military.

The automotive industry, according to the American Iron & Steel Institute, continued to be the biggest consumer of steel, receiving 835,465 net tons in September, compared with 820,493 in August. Total September distribution of steel products was 5,511,474 tons, compared with 5,329,060 tons in August. Jobbers, dealers and distributors were given 966,436 tons in September, an increase over the 869,448 tons received the preceding month.

Scrap Drive Pressed

Government - sponsored campaign launched though current supply conditions are improving

ALTHOUGH steel scrap supply currently appears less stringent than it was some months ago and pressure on the market is subsiding with mill inventories reported the best in a long time, the long term outlook is considered as serious as ever and efforts are continuing to be exerted toward bringing out as large a tonnage as possible.

The Scrap Drive Committee of the Commerce Department, during the winter months, plans to press its campaign and will call upon industry for a "house-cleaning" of obsolete dies, jigs, tools, fixtures and other machinery which can be converted to scrap.

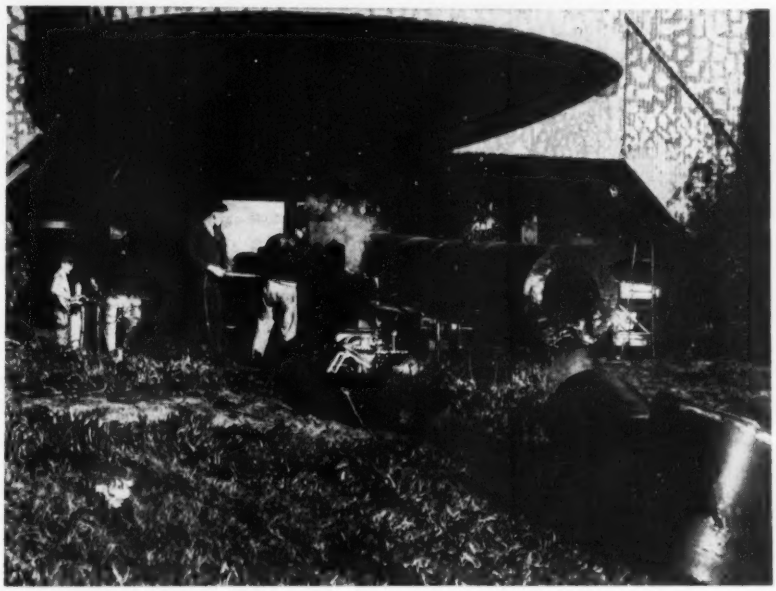
Meeting Held—This decision was reached at the first meeting of the recently-appointed group of more than 70 trade association executives at which ways and means for most effectively carrying on the scrap drive were discussed.

Theodore S. Repplier, president of the Advertising Council, described the part his organization will play in the drive. Edward Thayer, chairman of the Business Paper Advisory Committee of the Advertising Council, outlined steps being taken by the business press in support of the drive.

Imports of German Scrap Rise

IRON and steel scrap shipments from Germany to the United States reached a new monthly high in November, totaling 80,700 tons, the Office of Industry Cooperation announced last week.

This brings the 1948 total iron and steel scrap shipments from Germany to this country to nearly 237,000 tons. November shipments increased almost 30,000 tons over October.



HEADS FOR SCRAP PILE: Last of the big guns guarding the Golden Gate at San Francisco are being cut up for scrap. The Army has classified fixed gun emplacements as obsolete and guarding of the Pacific Coast has been taken over by anti-aircraft, mines, planes and mobile guns. NEA photo

Shortages Force Aluminum Quota Cuts

ECA pares allotments, cracks down on English, Belgian and Dutch resales of aluminum in U. S. Alcoa temporarily reduces domestic quotas as production falls

INCREASING shortages of aluminum have stirred up agitation for extension of the present voluntary allocation law or enactment of more stringent regulations. Seriousness of the situation was indicated by action last week by the Economic Cooperation Administration which cut aluminum allotments to England, Belgium and Holland for apparently using Marshall plan funds for obtaining metals for subsequent resale to America at a large profit.

Demand for aluminum in 1948 is estimated at about 500 million pounds in excess of supplies, despite record peacetime output.

"If the present heavy demand for aluminum continues, the current probability is that there can be no appreciable improvement in the supply situation before mid-1949," said R. V. Davies, vice president and general sales manager, Aluminum Co. of America, last week. Droughts throughout North America, combined with the great unprecedented demand for power have plagued the aluminum industry for many months.

Allocations Reduced — Aluminum Co. of America has taken cognizance of the supply-demand situation by making temporary reductions in allocations of aluminum products to its customers for the early months of 1949. Alcoa has cut back its own fabricating operations; at the same time it has made cuts in customer allocations, according to Mr. Davies.

Among the factors which will affect aluminum supplies adversely in the months just ahead are the fact that military requirements for aircraft and other defense applications are taking aluminum in increasingly large amounts; considerably less aluminum will be available for export to this country from Canada than in 1948 when about 70,000 tons in crude and semicrude form was received; and the abnormal supplies of usable scrap aluminum available for some time after the war have almost disappeared. In order to help relieve the shortage, leading producers have cut inventories dangerously.

Domestic Output Cut Seen—The domestic production outlook for 1949 is ominous. Aluminum Co. of America's production capacity will be reduced by about 40 million pounds per year in February when its Niagara Falls smelting works is closed permanently because electric power for its operation will no longer be available. According to Bonneville Power

Administration officials no more power will be available for aluminum production in the Northwest before 1954 and then only if new power dams and plants are constructed. Electric generating facilities now under construction in the Northwest will no more than take up the normal load contingent on the growth of the area.

On Nov. 13 aluminum plants using Bonneville power were ordered to make the following cutbacks in their use of power: Alcoa, Vancouver, Wash., 42,200 kilowatts; Kaiser Metals Corp., Spokane, Wash., 32,000 kilowatts; Reynolds Metals Co., Longview, Wash., 6000 kilowatts; Electro-Metallurgical Corp., Portland, Oreg., 1000 kilowatts. Reynolds plant at Troutdale, Oreg., was not affected as it has been operating within its contract minimum. Lower power supplies will reduce aluminum output during the winter at these plants an estimated 35 million pounds.

ECA Cracks Down—Following protests by the domestic aluminum industry that European countries used $26 million of United States recovery funds to buy the metal and then resold some of it to Americans at profits ranging up to 11 cents a pound, ECA announced it had cut allotments of lead to England, Belgium and Holland and warned of further drastic reductions unless the situation were corrected. From April through September, United States imports included 12,812 tons of aluminum scrap from England, 2368 tons of aluminum from Holland, and 673 tons of aluminum from Belgium, the latter through October. (For additional details, see page 132.)

Pricing Muddle Continues

Controversy over delivery prices likely to continue to rage for some time into the future

CONTROVERSY over Federal Trade Commission policy with respect to delivered pricing continues to rage throughout industry and it now is apparent it will be some time before a solution to the problem facing industrialists can be expected.

Just what will result from the recent probe by the Senate Trade Policies Committee is not clear. Whether this committee will recommend legislation is not known. Probably its action will hinge upon the outcome of conferences between representatives of the FTC and the committee.

A "lawyer's lawyer" has been selected by the FTC to work with William Simon, the Capehart committee's general counsel, in an effort to determine whether existing confusion about permissible pricing methods can be cleared up without amendment of the antitrust laws. He is Robert B. Dawkins, the FTC's legal adviser.

The National Competition Committee, in a state of organization at Pittsburgh to conduct a nation-wide drive for legalization of freight absorption for the purpose of meeting competitors' delivered prices, has not yet contacted the Capehart Senate Trade Policies Committee.

Recently speaking before the Economic Institute of the Chamber of Commerce of the United States, Norman W. Foy, general sales manager of Republic Steel Corp., said that if the FTC's aim with respect to delivered pricing is to benefit the greatest number of people by providing maximum free competition at consuming levels, then the program it is furthering is beyond human understanding for it will have the opposite effect.

Walter B. Wooden, associate general counsel of FTC, took issue with Mr. Foy holding that whoever claims or suggests that the decisions of the FTC and the courts with respect to pricing collide with the interests of a genuinely competitive business is fundamentally and dangerously wrong.

Plan New French Steel Plant

A GROUP of 8 steel companies in France has entered an agreement for joint financing and operation of a $50 million sheet and tin plate expansion program under the company name of Sollac in northeastern France, according to G. E. Stoltz, consulting engineer, Westinghouse Electric Corp., and A. B. McCloskey, assistant manager, project division, Westinghouse Electric International Co., who recently returned from a 5-week visit to France and other European countries.

This project will require about $15 million of electrical equipment apparatus, which is expected to be furnished by Westinghouse. Steel mill facilities include a 46-in. blooming mill, 66-in. hot strip mill, 44-in. 5-stand tandem cold mill, and a 66-in. 3-stand cold sheet mill. The program also includes installation of an electrolytic tin plate line.

The Usinor Co. is installing in northern France a 46-in. reversing blooming mill, 66-in. hot strip and 66-in. 3-stand cold strip mill, plus 66-in. and 48-in. temper mills, to supplement company's current product mix of rails, shapes and hand mill sheets. This program, expected to be completed early in 1950, involves expenditure of $27 million. United Engineering is furnishing the mills and Westinghouse the electrical equipment.

Unions Study Profits

Arguments for fourth round wage increases will be based on corporate earnings growth

LABOR union tacticians are watching closely the hearings on corporate profits being conducted by the joint Committee on the Economic Report in the expectation of obtaining some powerful ammunition for the fourth round wage drive next spring.

Comes the time for new wage negotiations, the union bargainers may be expected to stress the growth in corporate profits. Testimony presented at the hearings shows total corporate profits rose from about $4 billion in prewar years to around $10 billion during the war, to $12.8 billion in 1946, to $18 billion in 1947 and to $20 billion in 1948.

Labor leaders already are pointing out that whereas wage rates have doubled since prewar the increase in total corporate profits has been five-fold.

Wage Increase from Profits—Union spokesmen likely will be insistent that whatever wage increases are granted next spring come out of what they will claim to be excessive profits and should not be used as basis for further price increases.

At the same time, labor will ask that Congress impose an excess profits tax and price controls.

How High Are Profits?—This picture being drawn by the unionists is, of course, oversimplified, as has been shown in testimony by economists, accountants and businessmen before the committee.

Dr. Sumner H. Slichter of Harvard University told the committee that corporations have overstated their profits during the past three years by $16 billion dollars. Real profits, after corrections for climbing prices, would be $6 billion for 1946, $12 billion for 1947 and $16 billion for 1948.

A staff report prepared by the committee's own economists takes a similar view. Profits, it concludes, are not as large as indicated by corporate reports. The report suggests that profits should be adjusted to show relative purchasing power in the same manner in which the labor unions figure "real" wages, or purchasing power of the take home pay.

In periods of rising prices, the report points out, reported profits tend to show extraordinary dollar gains. Partially, this is due to a weakness in accounting methods.

Coast Steel Demand Eases

Pressure for shipments less urgent from some directions as trade develops soft spots

SIGNS are appearing that steel demand on the West Coast is lessening —at least for some products.

Several steel warehouses in California report that while sheets, plates and strip are still extremely scarce, customers appear to be showing less urgency in their demands for those products. At the same time, warehouse inventories of some sizes of carbon bars, alloy steels and some rounds are increasing. They report, too, that mills are offering those products more freely.

Supply and demand trends among fabricators vary considerably. Some purchasing agents say the difficulties in buying steel are as great as ever, but others report less trouble in getting certain products, either from mills or warehouses, and some say they are not ordering as far in advance as previously.

Spotty Situation—This demand appears to be affected most directly by the type of steel needed. Fabricators who use sheets and plates are still plagued by the shortage, but producers of finished goods, in which alloy steels and higher-priced products are the chief raw material, are not only finding supplies greater, but their needs are less.

Considerable differences in opinion exist as to the reasons for the changing steel picture. Some warehousemen believe it may be influenced by year-end reduction in inventories. They say a number of fabricators are moving very cautiously at present, especially those who serve defense industries, such as airplane manufacture. They seem to be waiting until the first of the year to see what Congress does on defense appropriations which may affect their future orders.

Other observers pin slackening demand for steel to sharp reductions in orders for finished goods which have affected many fabricators. Some firms, which have suffered a sharp cut in new orders and their backlogs of unfilled orders, say high costs of raw materials and labor are causing their customers to order less. The slow-down in construction, because of high costs, is believed a major reason behind the letdown in some fabricators' business. Structural steel firms report there now is less difficulty in obtaining steel shapes.

Gray Market Slips—A number of fabricators report that gray market prices have been dropping, and estimate the decline somewhere between 10 and 15 per cent in recent weeks.

The changing complexion of the supply-demand picture is creating new problems for the warehousemen. Several report their stocks are becoming badly unbalanced, with too small supplies in some products, sheets for example, and too large inventories in others.

Power Conservation Plan Urged

ORDERS have been issued by public utilities officials in Washington, Oregon and Idaho directing privately-owned utilities to prepare a conservation program designed to meet present and anticipated power deficiencies.

This is planned to supplement rather than supplant the voluntary curtailment program which has been under way for several weeks. A difference of opinion has arisen in power circles over the necessity of mandatory rationing. The states have no power over publicly-owned properties and Seattle light officials take the position they should not be further curtailed now.

Frank McLaughlin, president, Puget Sound Power & Light Co., states that any program should apply with equal force to both publicly and privately owned utilities. Seattle city officials announce the Seattle utility will be able to meet winter peak demands with industrial and consumer co-operation. Seattle's municipal plant has thus far had a current winter peak of 264,000 kw as against a 272,000 kw peak a year ago. In emergency it can draw on other plants in the Northwest pool.

Electricity Situation Still Critical

ELECTRIC generating capacity in the United States is expected to reach 72 million kilowatts by 1951 but the power situation will remain critical this winter, according to a study transmitted to President Truman by the National Security Resources Board. The gain in generating capacity from 1947 to 1951 will amount to 22 million kilowatts, and according to Arthur M. Hill, who recently resigned as NSRB chairman, "few industries in the country can equal this striking record of postwar expansion."

Mr. Hill said that there were few areas in the entire country that will have adequate operating reserves this winter. Margins for reserves, however, are expected to increase substantially in 1949 and 1950 and will be adequate by the end of 1951 ex-

BRILLIANT LIGHTS BATTLE FOG: Perched high atop a bridge ingeniously constructed of surplus steel "landing mat," workmen are installing Westinghouse krypton flash units in the approach zone at the Landing Aids Experiment Station, Arcata, Calif. Krypton units, capable of producing flashes of more than 3-billion peak candlepower, are alternated with neon units to provide an all-weather approach system

cept in the Pacific northwest and the southeast where shortages will continue in event of a dry year.

Coal Production Curtailed

REPLENISHMENT of the national soft coal stockpile to about the 70 million ton mark has resulted in some curtailment in production. This has not affected the steel industry's captive pits mining metallurgical coal, which are still working 5 days or more weekly, or very many mines producing top grade bituminous coal.

The large stocks of coal reflect the generally mild weather which most sections of the country have been enjoying this fall. A cold wave would dispel the threat to overproduction.

Truck and strip mining operations in the Pennsylvania, Ohio, Kentucky, Colorado and Maryland soft coal fields were principally affected. Pennsylvania's anthracite fields also face the probability of a 4-day work week.

Divergent views were expressed in the West Virginia and Pennsylvania soft coal fields where mine operators said production was relatively normal, while a union official said 2500 miners in the Pittsburgh area alone have been idle for seven weeks. Part-time operations have cut earnings of about 5000 miners in the Cumberland, Md., district by about 50 per cent, accordind to a union official. Miners are working only 4 days a week in the Colorado mines; only 2 or 3 days a week in the truck mines in the western Kentucky field, with some completely shutdown; less than 5 days in some northern West Virginia mines, due chiefly to a freight car shortage.

The Pennsylvania anthracite committee last week fixed a 723,000-ton production quota for the second successive week, this being the lowest schedule in years and resulting in a 2 to 3-day work week in most mines.

Crucible May Sell Furnaces

NEGOTIATIONS are under way for sale of four 50-ton basic open-hearth furnaces and two 10-ton electric arc furnaces at Crucible Steel Company of America's Park Works, Pittsburgh, to Deere & Co., Chicago. The two small electric induction furnaces at this plant are not involved in the negotiations.

Under the proposed arrangement Crucible Steel would continue to operate the furnaces, with bulk of output going to Deere for conversion elsewhere. The negotiations will not interfere with Crucible's finished steel operations at the Park Works or in production of agricultural steels at its Midland, Pa., Works.

New Continuous Coal Miner Developed

CONTINUOUS mining of coal, with attendant savings in labor costs and greatly accelerated output, took another step forward last week when the Joy Mfg. Co., Pittsburgh, publicly unveiled its continuous mining machine. The Joy miner has been undergoing tests in various coal fields for the past year and now is in production at the company's plant in Franklin, Pa.

The Joy machine consists essentially of a ripper bar or head which tears the coal from the face, discharging it into an intermediate conveyor which discharges it into a centrally located hopper. From this point the coal is picked up by a rear conveyor which carries it back to transportation means. Both conveyors and ripper head are mounted on a main frame which carries the auxiliary equipment and is in turn mounted on caterpillars.

The continuous miner operates as follows: With the ripper bar in retracted position, the machine is advanced to the coal face. The ripper bar then is sumped 18 inches into the coal, hydraulic pressure applied upward, forcing the ripper bar through the coal to the top of the seam. These strokes are repeated until the desired width of mined area has been reached.

The ripper bar is 30 in. wide and is equipped with six chains, each containing 20 replaceable carbide mining bits. Each chain is driven by a separate sprocket on a main driving shaft which is attached at each end to a gear reducer that advances with the ripper head. Power is supplied to each gear reducer by a 65-horsepower motor.

J. D. A. Morrow, Joy president, says the machine is designed to mine 2 tons of coal a minute, although this will vary with the characteristics of each seam and each mine and with the efficiency of the transportation system hauling coal away from the machine. How near operators will approach the design capacity depends on many factors.

Several other companies have developed or are developing continuous miners. Sunnyhill Coal Co., Pittsburgh, demonstrated its "Colmol" last month (STEEL, Nov. 8, p. 63).

Photo shows front of the continuous miner and construction of the ripper bar. Mr. Morrow and Arthur Knoizen, executive vice president, are inspecting the machine.

Capital Equipment Needed

Procurement by manufacturing industries seen holding $10 to $11 billion annual rate

CAPITAL equipment procurement by United States manufacturing industries should continue for a number of years at the present record rate of $10 to $11 billion annually, or more, members of the Machinery & Allied Products Institute were told at a meeting in Washington Dec. 10-11.

George Terborgh, MAPI's research director, produced a specially prepared chart, which traced the expenditures for capital equipment from 1870 through 1948. Current business in such equipment now is about 20 per cent above the trend line—and should continue at that level to make up for reduced capital equipment buying during the depression of the '30s and the period of World War II.

Survey Results—Dexter M. Keezer, former OPA economist and now economics director for the McGraw-Hill Publishing Co., agreed with the above prediction but got at it in another way.

Preliminary results of a recent survey which he conducted over a wide cross-section of industry show that manufacturers fully expect to continue buying capital equipment at the current rate for a long time to come. There is a lot of obsolescence in American industry, said Dr. Keezer, and manufacturers must do a vast amount of modernizing if the United States is to retain its industrial supremacy in the face of the rapid strides the Russians are making in industrialization.

Findings Preliminary—Both speakers warned that their findings must be received with reservations. Whether the trend line based on capital equipment expenditures since 1870 is valid today is yet to be proved, said Mr. Terborgh, as there is no means of knowing the extent to which its significance may have been altered as a result of the heavy diversion of profits to taxes in recent years.

Dr. Keezer cautioned that the extent to which manufacturers will modernize, as compared with their present desires and expectations, will depend on their future profits. Profits, he reported, are relied on for the overwhelming proportion of the money expended for capital equipment; about two-thirds of the profits of industry now are being invested in modernization.

In a discussion on pricing at the meeting a number of participants maintained that the Supreme Court decision outlawing use of the basing point system in the sale of cement had been emphasized out of all proportion to its significance.

No New Principle — Corwin Edwards, chief economist, division of industrial economics, Federal Trade Commission, Mark S. Massel, Chicago attorney, and Edwin B. George, economist of Dun & Bradstreet Inc., were in accord in the view that no new principle was involved in the Supreme Court ruling, holding that it attacked collusion in pricing, a practice that had always been illegal.

Make Stability Recommendations

OVERALL economic stability attained within the framework of a free and progressive economy in the United States is essential to a free and stable world, is the conclusion reached in a study released recently by the Committee for Economic Development, New York.

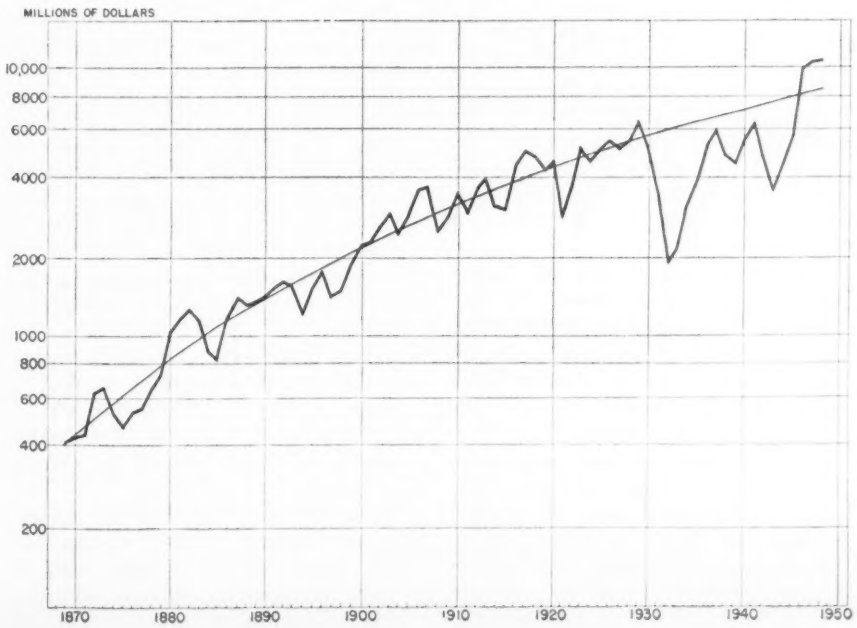
Entitled, "Monetary and Fiscal Policy for Greater Economic Stability," this study is the first in a series aimed at answering the question, "Can a free society in these crisis times steer a middle course of stability between the dangers of economic collapse and extreme inflation, meanwhile strengthening its national defense, and yet preserve for its members basic economic and political freedom?"

Recommendations — Recommended elements in periods of inflation are: 1. Hold tax rates stable, so that tax revenues will rise as the national income rises and the government surplus will increase; 2. use the government surplus to retire debt held by the commercial banking system, including the Federal Reserve banks; 3. refund maturing government debt in a way that will reduce the holdings of the banking system; 4. tighten the reserve position of banks, by Federal Reserve sale of government securities in the open market, by increase of rediscount rates and/or by increase of reserve requirements; 5. reduce volume of government loans and guarantee of loans.

In periods of depression CED recommends: 1. Hold tax rate stable, so that revenue will fall as the national income falls and the government surplus will decline or turn into a deficit; in extreme conditions a temporary reduction in tax rates may be desirable to stimulate private expenditure; 2. expand the money supply and increase bank reserves by open-market purchase of government securities; further ease the reserve position of banks by reduction of rediscount rates and/or by reduction of reserve requirements; 3. finance the deficit, if there is one, by borrowing in a way that will induce the commercial system to acquire government securities, with such Federal Reserve action in providing additional bank reserves as may be necessary; 4. refinance maturing federal debt in part by borrowing from the commercial banking system, including the Federal Reserve banks; 5. expand the volume of federal loans and guarantees of loans, within the scope of the federal loan program accepted as appropriate in the long run.

EXPENDITURES FOR PRODUCERS' EQUIPMENT SINCE 1870

(In 1929 Dollars)



Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Munitions Board developing standardization of machinery and equipment. Internal combustion engine is first studied because of complex replacement parts problem

NOW THAT the three armed services, with the Munitions Board's Procurement Policy Council as co-ordinator, are off to a good start in the standardization of internal combustion engines, thought is being given to standardizing other kinds of machinery.

Internal combustion engines were selected for the first approach because the replacement parts problem in connection with such machinery is particularly complex. Now that some progress has been made in promoting interchangeability, military procurement brass hats feel somewhat encouraged. They are thinking of launching a similar standardization drive in the field of construction and road-building equipment in the near future. After that similar moves will be made with reference to other machinery whose maintenance requires large stocks of repair parts in the field.

Provides Reassurance — Machinery manufacturers generally should feel reassured by the philosophy the procurement heads have developed in reference to this standardization work. First, in dealing with machinery which is required for civilian as well as military purposes, they will make no moves without approval of representative industry advisory committees. Second, they will not attempt to "freeze" any particular existing models; rather, they want to leave the way wide open for industry to design new and better machinery in the traditional way. Third, no standards are worth anything unless they are based on the ability of industry to produce; there would be no sense, for instance, in trying to set up standards that would require retooling of industry on a substantial scale.

In other words, there will be no arbitrary setting of standards, and there will be no revolutionizing of current designs of machinery. Rather, the approach is on standardizing parts and components without disturbing basic designs.

In industrial internal combustion engines, for example, meetings with the manufacturers have led to the opinion that there can be uniformity in carburetors, engine mountings, bearings, spark plugs and similar items. A survey now under way is expected to reveal other components on which the manufacturers will be willing to standardize.

To illustrate further the moderate attitude of the procurement officials, their idea with reference to bulldozers, for example, is that uniform toggle pins, fittings and bearings seem like realistic objectives.

Result in Savings—Such standardization, military officers point out, may not represent the ultimate that might be desired, but it would bring immediate savings in the inventories of spare parts that have to be carried at military depots, and it would materially reduce the time required for placing a damaged machine back in operation. And if the effort at standardization is carried along continuously instead of as a one-shot activity, the advantages in the course of time will be great.

In their work of standardization, the procurement officers recognize three broad classifications. In strictly military goods such as howitzers, machine guns, messkits, haversacks and the like there is no problem; standardization can be effected without difficulty. It is in the field of semicivilian goods, such as the many mechanical assemblies that are used by both military and civilians, that the problems lie.

A good example of the kind of problem encountered in connection with semicivilian goods is in the field of motor trucks. The conventional motor truck is equipped with a 6-volt electrical system, and for this reason the armed services had to use enormous quantities of dry-cell batteries during World War II to operate radio transmitter sets. If motor truck manufacturers could see their way clear to go to a 24-volt electrical system, that would take care of the radio transmitters, and the need for dry-cell batteries would be sharply reduced.

So a question motor truck manufacturers will be asked to answer is: Is it feasible to standardize on 24-volt electrical systems for motor trucks for civilian as well as military purposes?

The third classification in the approach toward greater standardization embraces goods which can be procured from the civilian supply—goods such as hand tools, handkerchiefs and thousands of others. In this field some effective work already has been done, either by reducing the number of items in the military catalog to the number of items used by civilians, or by getting the manufacturers to simplify sizes and styles.

The catalog of the armed services now lists some 300 antifriction bearings as compared with some 3000 that previously had been listed.

Amazing Results—The performance in the field of electronics components shows the amazing results that can be obtained by consulting with the manufacturers. Before standardization the catalog listed 3000 electronic tubes; now it lists 800 different tubes to take care of replacements, and 195 tubes for fitting out equipment of the latest designs. Before standardization electronic instruments numbered 37,000 and after standardization some 3700. Transformer cases numbered 10,000; now there are only 22. Crystal holders numbered 350; now there are 3.

Certain exceptions exist in the field of civilian goods when the military services do their specifying. For instance, certain hand tools require noncombustible handles; others have to weigh as little as possible. Such considerations are being studied carefully to determine whether in such cases the military must buy special designs, and pay higher prices for them, or whether civilian standards might be changed in some of these cases to take care of military needs. Discussions on such problems will be held with industry on an increasing scale.

Promote Standardization—Thought has been given to standardizing materials handling equipment. Pallets already have been standardized. Procurement officers think it would be an advance to achieve standardization of a limited range of fork-type lift trucks, but do not propose to ask for anything the manufacturers disapprove. Some thought has been given to setting up a research laboratory to be devoted entirely to materials handling problems and the design of limited equipment that will meet all needs; this is just talk so far and nothing tangible has been decided.

For a better understanding of the setup by which the procurement officers approach problems of standardization, the program involving internal combustion engines again may be cited. The responsibility for carrying on the program is lodged by

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STUDY PRICE TRENDS: The Council of Economic Advisers keeps close tab on price trends, recently reported to the President that the situation is "improving" but is still dangerous. Dr. Edwin G. Nourse, council chairman, is shown tracing trends on a chart. Looking on are John D. Clark, left, and Leon Keyserling. NEA photo

statute in the Munitions Board's Procurement Policy Council; this consists of Maj. Gen. Daniel Noce of the Army, Rear Admiral Morton M. L. Ring of the Navy, and Maj. Gen. E. M. Powers of the Air Force.

The internal combustion engine assignment breaks down into three categories: Automotive engines, assigned to the Army Ordnance Department; industrial engines, assigned to the Army Corps of Engineers; marine engines, assigned to the Navy Bureau of Ships. But, while these individual units are responsible in each case, they function through inter-service committees, and directly with advisory committees representing the interested manufacturing industries.

So far the standardization program of the armed services has not gone much farther than to scratch the surface. As time goes on the work will broaden out to embrace thousands of products. In all cases involving products that are of interest both to civilians and the military, the work will be done through industry advisory committees, for the most part still to be appointed.

Inflation or Deflation?

AN INTERESTING point developed in the press conference in the Washington Hotel, Washington, at which the Committee for Economic Development announced the economic stabilization program recently completed by its Research & Policy Committee. Highlights of the report were recommendations of actions the federal government should take under conditions of inflation and reverse actions it should take at times of deflation.

One of the news correspondents, Felix Belair of the *New York Times*, asked J. Cameron Thompson, a principal author of the report, which course of action would be applicable right now; in other words, asked Mr. Belair, are we now confronted with an inflationary or a deflationary trend?

Must Await Budget—Mr. Thompson, who is president of the Northwest Bancorporation with headquarters in Minneapolis, and is recognized as one of the country's most able bankers, replied, in effect, that he was not prepared to state whether we now are in an inflationary or a deflationary trend. While some easiness has developed in the general business situation, he said, it would be impossible to determine the future course of business activity and economic strength until the federal government decides on its budget for fiscal 1950.

In the discussion that followed, participated in by a number of newsmen, the following impression seemed to be widely held: It is fine and dandy to lay down a program to be applied in time of inflation, and a reverse program in time of deflation —but the difficulty lies in determining, at any given time, whether we are confronted with an inflationary or deflationary trend; the difficulty lies in the fact that it never is possible to make accurate allowance for economic developments that may develop in the near future.

Further studies are being made by the CED, said Mr. Thompson, and conclusions will be announced over coming months. The CED, he said, will be in a far better position after the federal budget has been fixed for the coming year to judge whether an inflationary or deflationary trend lies immediately ahead.

Income Tax Booklet Available

THE 1948 edition of "Your Federal Income Tax" has just been completed by the Treasury's Internal Revenue Bureau and now may be had at 25 cents a copy from Superintendent of Documents, Government Printing Office, Washington 25, D. C.

The book, which is not to be confused with the new 16-page instruction pamphlet which is being mailed to taxpayers free of charge along with Form 1040 return blanks, has been completely revised and now contains 115 pages of answers to many questions confronting income tax payers.

New Special Machinery Market

NEW MARKET for special machinery may be ready for exploitation as result of discovery by the Department of Agriculture of a new process for making potato flour. Raw potatoes are washed, inspected to eliminate spoilage, and ground, skins and all, in a hammer mill. A small amount of sulphur is added to keep them from turning dark. Then they are dried in a standard steam-tube dryer; some of the dried material is added to the incoming charge to lower the moisture content and prevent ground potatoes from sticking to the tubes. After drying, the ground material is run through a second hammer mill, screened into flour and bagged.

Potato flour, it is estimated, can be produced in this manner at about $39 a ton, not counting cost of the potatoes.

Details of the new process are available from the Bureau of Agricultural & Industrial Chemistry, Eastern Regional Research Laboratory, Philadelphia 18, Pa.

British Auto Show First in Ten Years

English, French, Italian and American models seen by record crowds at last month's London exhibition. British styling now follows American trends more closely

REVIVING activity in European automobile industries was highlighted at last month's London Motor Show which displayed British, French and Italian models, as well as some American makes.

The show—the 33rd International Motor Exhibition organized by the Society of Motor Manufacturers and Traders—was the first held in ten years and was attended by a record 562,954 persons. In body styles many of the new models shown have departed from the traditional radiator and hood construction and have gone over to the sweeping lines and wide frontal work favored by American designers. Greater engine efficiency and improvements in transmission, suspension, braking and steering have been achieved on British models, as well as advances in interior furnishing and refinements. Wider bench-type front seats have been adopted generally, and the gear lever in most cases has been fitted on the steering column, as on American cars.

Thirty British Cars Shown — In all, 30 British cars were exhibited, together with 6 French, 1 Italian and 13 American. The least expensive car in the show was the Ford Anglia, priced at $1240 including taxes. An outstanding model in the low power category was the new Morris Minor, featuring an 8 hp motor but an unusually roomy body.

One Austin model was a newly designed convertible aimed at the American market. Hillman showed a specially built car with component parts cut away to reveal construction. Standard displayed its "estate wagon," an all-steel station wagon type. Talbot and Humber entries were also in the streamlined category, as were two new Wolseleys which claimed distinctive lines and exceptional power to weight ratio. Retaining their conservative stylings, however, were Rolls Royce, Daimler, Bentley, Rover and Jaguar.

Models displayed by the American exhibitors attracted attention for their dramatic body designs and interior furnishing and equipment. The new Lincolns and Mercurys were centers of interest, as were the Chrysler, Dodge, Hudson, Packard, Studebaker, Kaiser, Cadillac, Buick, Oldsmobile, Pontiac and Chevrolet entries.

French Exhibits — French exhibits which attracted considerable attention were the 4 hp Renault with rear engine and the small Rovin 2-cylinder two-passenger model. Proving of interest, also, was the Citroen with a front wheel drive.

More than 70 booths were occupied by service equipment suppliers who featured lifting equipment and jacks, special workshop tools and electrical testing and engine tune-up devices. Other notable lines were a disc-operated oil dispenser, electric vulcanizer with swing arms, new decarburizing tools, special shock-action wrench tools and automatic battery chargers.

Speaking at the annual dinner of the sponsoring society, G. R. Strauss, Minister of Supply, was unable to offer additional hope to automakers for more steel. Prospective British buyers will still have to wait 1 to 3 years for delivery. Mr. Strauss, however, commented on the industry's excellent export record, pointing out that more than 400,000 cars have been exported since the end of the war, many to the United States. In his opinion, he said, the foothold British automakers have gained in the American market will be retained even when more normal demand returns.

Auto Exports Fall — In the third quarter, however, exports of automobiles and chassis dropped 12 per cent below the high level of this year's second quarter. The fall was in small and medium sized vehicles. Exports of large cars rose 13 per cent above the second quarter average.

Exports of iron and steel in the first 10 months of the year totaled 1,635,143 tons, compared with 1,583,303 tons in the same period of last year. Value of Britain's exports of manufactured iron and steel products in October exceeded $40 million for the first time since 1921. The largest buyer remains the Union of South Africa which took about 15,000 tons in October, followed by Denmark which took 11,000 tons.

Total iron and steel imports so far this year have not reached the amount recorded for the same period in 1947, but there was a large increase in imports of semifinished steel in October when 22,971 tons came in as compared with only 8579 tons in the same month of 1947. No ingots came in at all during October, whereas in the first ten months of 1947, Britain imported 101,372 tons; only 19,180 tons have been imported in the same period of 1948. Exports of galvanized sheets show a substantial increase compared with a year ago.

Mounting steel exports have brought protests from domestic consumers, particularly shipbuilders, locomotive builders, power plant constructors and colliery owners, whose operations are all handicapped by the scarcity of steel.

Western Germany

WESTERN German automobile firms are also resuming production The auto works of Steyr-Daimler-Puch has begun to turn out 3½ ton busses with an 85 hp diesel engine

Britain's first auto show in ten years had 50 different English, French, Italian and American makes on display

British Steel Output Hits Another New High

BRITISH steel industry again hit a new record in steel production. In November, the weekly average reached 303,000 gross tons which is an annual rate of 15,766,000 tons. The previous high month in the industry's history was October, 1948, when output ran at 297,200 tons a week. Excellent scrap collections and good pig iron helped produce the record in November.

PIG IRON
(gross tons)

	1947		1948	
	Weekly Average	Annual Rate	Weekly Average	Annual Rate
First 9 months	140,900	7,326,000	177,500	9,230,000
October	160,600	8,352,000	183,200	9,525,000
November	165,900	8,627,000	185,300	9,636,000

STEEL INGOTS AND CASTINGS
(gross tons)

	1947		1948	
	Weekly Average	Annual Rate	Weekly Average	Annual Rate
First 9 months	231,800	12,055,000	283,700	14,752,000
October	275,300	14,316,000	297,200	15,455,000
November	272,600	14,174,000	303,000	15,756,000

and capable of a speed of nearly 50 mph. Motorenwerke Wolfsburg has taken an order for 3000 volkswagens or people's cars for Sweden.

The improving steel production is generally responsible for better showings in the auto industy. As a result of this rising output, export activity has also increased markedly. A group of Ruhr concerns has received a contract from Turkey for construction of a steel bridge and several factories in exchange for foodstuffs. Various offers of foreign sheets and plates have been made to German steel consumers recently. Even American sheets have been offered to Ruhr manufacturers of ranges, ovens and stoves. In one case, an American dealer offered 65,000 tons of sheets to a range maker.

The preparatory steps for carrying out the new organization of the Ruhr steel industry are being taken rather slowly. Membership upon the custodian boards is being decided now. Personnel will consist of representatives from unions, managements and the present public bodies administering the steel industry. It will probably be next spring before the new steel organization can take over. Incidentally, another American group is now in Germany to review the progress made in carrying out the decartelization program in Germany. Chairman of the group is Garland S. Ferguson, Federal Trade Commissioner. Other members are Samuel S. Isseks, New York City attorney, and Andrew T. Kearney, Chicago management consultant.

The American committee on dismantlings is expected to finish its report on Ruhr dismantlings by the end of this month. A final report will go to the Economic European Administration which will use the findings as a basis for negotiating with other Marshall Plan nations on a final disposition of the vexing problem.

France

THE COAL strike has focused attention on the development of electric power in France. It has already been raised from 1548 million kwh in 1938 to 2300 million kwh in 1948, but the increase falls below the target set in the Monnet plan. Lack of steel accounts for much of this failure, and the steel scarcity is partly traceable to the long series of strikes in France since the war.

In 1947 the nationalized Electricity of France received 22,000 tons of steel less than it needed. This year it has received only 60 per cent of its requirements. Financial difficulties also plague the industry, for the government has been niggardly with it in the national budget. Consequently six expansion projects have been stopped. A capacity of 4 billion kwh planned for 1951 will not be achieved until 1953 at least.

Some expansions, however, are still in progress, thanks largely to American equipment. A recent receipt was a huge boiler drum from Babcock & Wilcox's Barberton, O., plant. This boiler, last of three shipped this fall, will boost the electrical output for Paris.

Yugoslavia

MACKENZIE Engineering Co., London, England, is reported to have come to an agreement with Yugoslavia to take over the planning and development of the country's iron and steel industry.

The agreement was made outside of any official agreements between the British and Yugoslav governments. Most interesting were the facts that this agreement was made with British, not Russian interests, and that MacKenzie has been promised a free hand and access to production statistics, hitherto "state secrets."

Seek Machinery for Africa

SPURRED by Economic Cooperation Administration efforts to push Marshall Plan funds behind increased exports of metals, there has been a sharp increase in the number, size and variety of inquiries for machinery to be used in Africa during the past few weeks. Immediate aim is to increase the output of copper by 25 per cent as well as boost production of other critically scarce nonferrous metals.

Most of the requests are from large interests in Europe and Great Britain for railroad and other transportation equipment, mining equipment, materials handling equipment, tools and miscellaneous industrial supplies with volumes ranging in the multi-million dollar brackets. Present plans call for the direct assistance to industries in any Marshall Plan controlled territory or colony and it is expected that no difficulty will be encountered in expediting orders after U.S. government preferences for rush shipments have been expressed.

Heads Commerce Steel Division

FRANK T. McCue has been named acting chief, Iron & Steel Division, Office of Domestic Commerce, succeeding Elliott S. Hanson who recently resigned as chief to go with the Economic Cooperation Administration.

A graduate of the steel industry, he formerly was connected with Carnegie-Illinois Steel Corp., Pittsburgh, and has had extensive experience in Washington. He was a member of the Steel Division, War Production Board during World War II. Since then he has been with the Office of Materials Distribution, successor to the Civilian Production Administration, handling export priorities under Public Law 188.

Mr. McCue is a member of the Operating Committee of the Committee on Requirements which advises Secretary Sawyer on matters affecting policies in reference to exports and domestic allocations.

Discuss Diesel Problems

Manufacturers consider various questions relating to use of dual-fuel engines at meeting

PROBLEMS which have arisen from increasing use of engines burning both oil and gas fuel were the chief topics of discussion at the Diesel Engine Manufacturers Association's annual meeting, held in Chicago recently.

The diesel industry is keenly interested in the quality of gas to be had, in what quantity, and how much it would cost. Having developed the dual-fuel engine, the diesel industry wanted assurance from coal industry officials that gas would be available wherever the engines were located.

Believing gasification is the most economical way to use the nation's coal resources, the Battelle Memorial Institute has under way an extensive program of gasification of coal. Need for a good gas-producing unit was stressed at the meeting. The big present-day producers must be redesigned, it was claimed, so that they are smaller, portable and less costly. They must produce clean gas and be "reasonably automatic and foolproof insofar as the operator is concerned," Carl E. Miller, Battelle's technical adviser, said.

An economic study by Battelle of a producer yielding a gas of 150 to 180 Btu per cu ft, indicated that the cost of such gas would be about 5.6c per therm, with coal at $7.50 per ton. J. B. Morrow, president, Bituminous Coal Research Inc., commented that the possibility of economical production of oxygen-enriched air might yield dividends in the economic production of producer gas with heating values as high as 450 Btu. A joint committee was formed to study possible developments on the part of companies already making producer equipment and to study the possibilities of concentrated research by coal companies and various other industries interested in this kind of equipment.

Training—Engineers of the Diesel Engine Manufacturers Association, holding special meetings, discussed the hiring and training of young engineers; the advisability of supplementing the association's book "Standard Practices"; and filters and filtering, deciding that a set of standards should be established for the former.

Dr. John T. Rettaliata, dean, School of Engineering, Illinois Institute of Technology, guest speaker at the association's dinner, said there are 53 gas turbine units in the country producing 276,500 kw. "In most applications the turbine is not a direct competitor" with the diesel engine, he said. "Up to 2500 horsepower, the diesel will not have serious competition from the turbine. In applications from 5000 to 20,000 horsepower the gas turbine will have a field of its own."

At the meeting Robert H. Morse Jr., vice president in charge of all operations, Fairbanks, Morse & Co., was elected president and treasurer. Elected as vice presidents were A. W. McKinney, executive vice president, National Supply Co., and O. H. Fischer, president, Union Diesel Engine Co. Harvey T. Hill was reappointed executive director.

Warm Air Furnace Group Meets

PRODUCTION of warm air furnaces currently is off 10 per cent from 1947, stated Atlee Wise, president, National Warm Air Heating & Air Conditioning Association, addressing the association's 35th annual convention at the Hotel Cleveland, Cleveland, recently.

Metal shortages are largely responsible for the decline, he continued, and the voluntary allocations program which has helped the industry as a whole, should in the opinion of most members, be continued.

Speaking at a luncheon meeting on the opening day, Lowell B. Mason, Federal Trade Commissioner, stated that businessmen must ask their representatives in Congress for relief from the current pricing muddle. He stated that despite statements to the contrary issued from time to time by various FTC commissioners, businessmen should accept the fact that at the present time freight absorption, zone prices and quantity discounts are all out. Mr. Mason also criticized the FTC's practice of considering individuals or groups guilty of violations, once they have been so charged, unless they can prove their innocence.

Re-elected to serve during 1948-49 were the following officers: President, Atlee Wise, Wise Furnace Co., Akron; 1st vice president, Clarence S. Franke, American Furnace Co., St. Louis; 2nd vice president, William D. Redrup, Majestic Furnace Co., Huntington, Ind.; secretary-treasurer, George Boeddener, Cleveland. Elected as directors to serve a two-year term: Herbert Curtis, Auer Register Co., Cleveland; Edward Paul, Clayton & Lambert Mfg. Co., Louisville; Frank L. Meyer, Meyer Furnace Co., Peoria, Ill.; and Gilbert W. Denges, Williamson Heater Co., Cincinnati.

Scrap Institute Meets Jan. 17

WILLIAM G. MARKS, chief of the safety standards division of the Bureau of Labor Standards, Washington, has been added to the list of experts who will address the opening day's business session at the Institute of Scrap Iron & Steel's convention in Cincinnati, Jan. 17-18.

Mr. Marks, who is responsible for the general administration and direction of the government's safety services and programs will outline his department's part in the institute's expanded accident prevention program slated to get under way on a nationwide basis in 1949.

PEI Adds Plumbing Division

DISSOLUTION of the Formed Metal Plumbing Ware Association has been completed and former members of the group now belong to a special division of Porcelain Enamel Institute. The new PEI division, consisting of representatives of practically the entire steel plumbing ware industry, was incorporated during a recent meeting as the Steel Plumbing Fixture Division of Porcelain Enamel Institute.

Calendar of Meetings . . .

Jan. 4, American Washer & Ironer Manufacturers' Association: Annual meeting, Morrison Hotel, Chicago.

Jan. 10-14, Materials Handling Institute and American Society of Mechanical Engineers: Materials handling show, in Philadelphia. ASME's management and materials handling divisions will conduct a five-day materials handling conference concurrently with the exposition.

Jan. 16-20, Associated Equipment Distributors: 30th annual meeting, Hotel Stevens, Chicago. Group's executive office is at 360 N. Michigan Ave., Chicago.

Jan. 17-18, Institute of Scrap Iron & Steel: Convention, Netherland-Plaza Hotel, Cincinnati. Institute executive vice president is Edwin C. Barringer, Dupont Circle Bldg., Washington.

Jan. 20-22, Society for the Advancement of Management: Conference on industrial mobilization, Chicago. Society headquarters are at 82 W. Washington Blvd., Chicago.

Jan. 24-28, American Society of Heating & Ventilating Engineers: Ninth international heating, ventilating and air conditioning show, International Amphitheatre, Chicago.

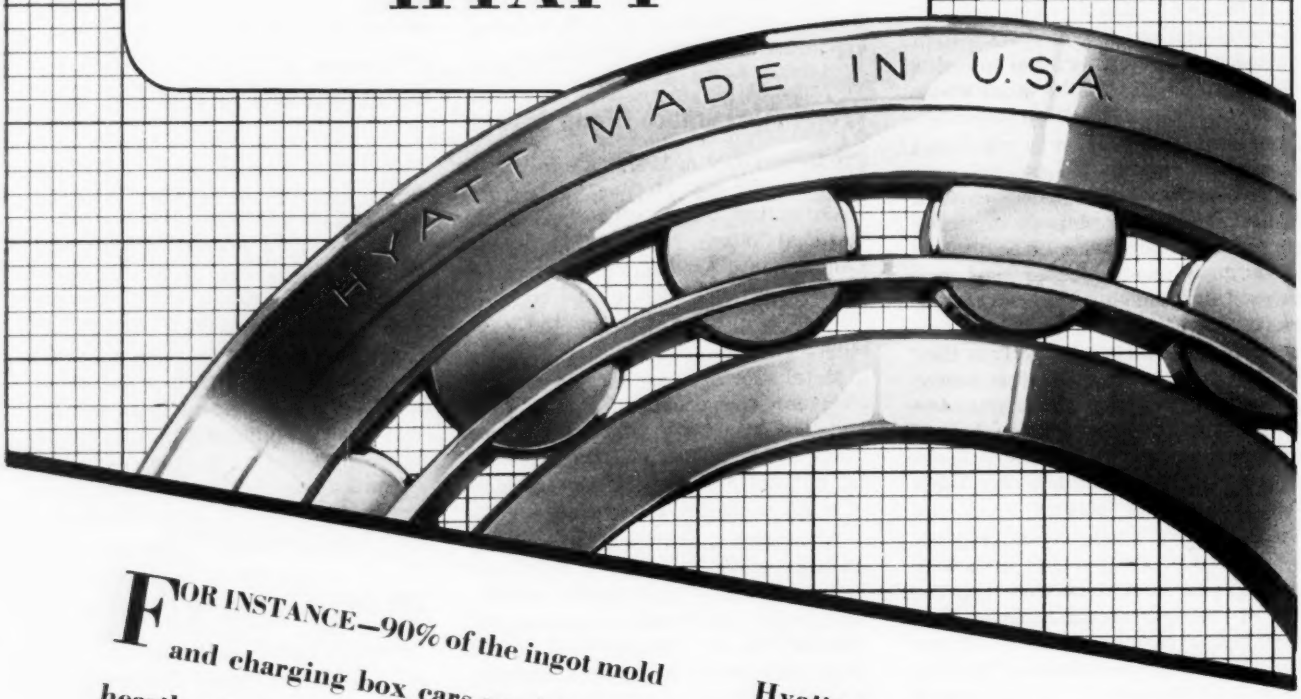
Jan. 27, Stoker Manufacturers Association: General meeting, LaSalle Hotel, Chicago. Association headquarters are at 307 N. Michigan Ave., Chicago.

Feb. 13-17, American Institute of Mining & Metallurgical Engineers: General meeting, San Francisco.

Feb. 21-22, Purdue University and Material Handling Institute: Materials handling conference on Purdue campus, Lafayette, Ind.

Feb. 28-Mar. 4, American Society for Testing Materials: Spring meeting and committee week, Hotel Edgewater Beach, Chicago. Society headquarters are at 1916 Race St., Philadelphia.

Steel men prefer bearings made by HYATT



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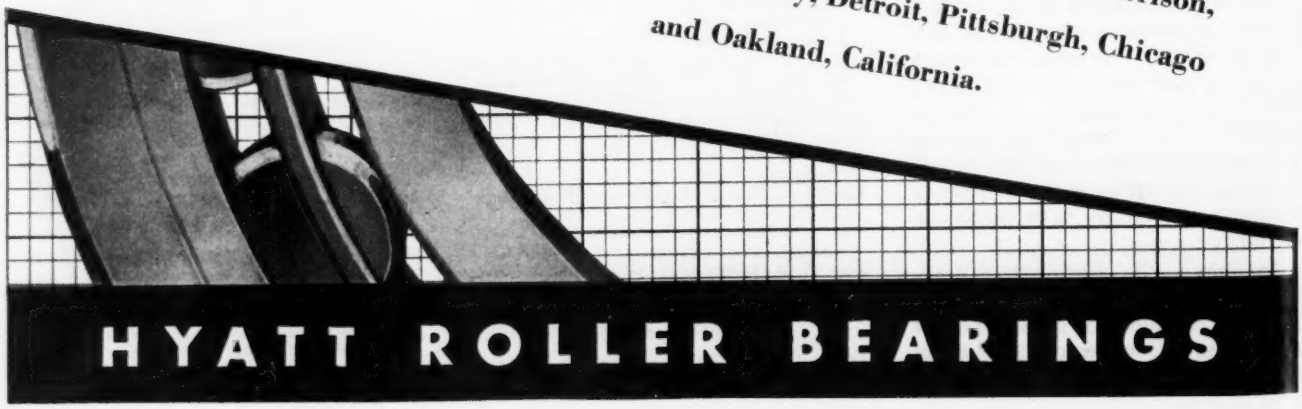
Hyatts too are preferred for table, crane and motor applications throughout the mills. That's why so many of them are used for changeovers and specified for new equipment. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey; Detroit, Pittsburgh, Chicago and Oakland, California.



HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Production of 100 million motor vehicles hailed at banquet of Automobile Manufacturers Association. Secretary of Commerce Sawyer, Boss Kettering speak

DETROIT

IF ORIGINAL planning had gone through, the featured speaker at the recent commemorative banquet of the Automobile Manufacturers Association, milestoning the production of 100 million vehicles over the past 52 years, would have been no less a personality than Winston Churchill, doughty wartime leader of the British Empire and now directing His Majesty's opposition in Parliament. Every effort was made to persuade him to visit the United States and deliver one of his trenchant addresses before the motor industry leaders. Only the demands on his time for leading the fight against further socialization of British industry dictated against his acceptance of the invitation at this time. If he had found it possible to make the trip, the A.M.A. ceremonies on Dec. 9 would have set a new high in an industry noted for its ability to mark milestones in really "sock" fashion.

As it turned out, although the anticipated international flavor to the meeting did not materialize, the two distinguished speakers who addressed the 500 "black tie" guests performed capably under the direction of toastmaster K. T. Keller, Chrysler president. The latter reviewed at some length the historical march of automotive manufacturing in terms of personalities and processes, interspersing his remarks with asides of typical Keller spiciness—thus his definition of a competitor as "the guy who starts through a revolving door behind you and comes out ahead of you," and his reference to chrome plating as the answer to making model changes without spending anything for tools and dies.

Asks Restraint by All—Charles Sawyer, secretary of commerce, presented a calm and studied analysis of the automobile and American economy, the first half of which was broadcast in 18 different languages throughout the world by the State Department's Voice of America. As a forecast of any administration planning on business controls, his comments were conspicuous by the absence of any such references. To those who have echoed fears over future regimentation of industry, he said (but not for the radio audience), "could the fearful ones by any chance be afraid of four more years of prosperity."

Turning from the facetious to the specific, he went only so far as to generalize that "some discipline and some restraint, and even sacrifice, may be required of all of us. Business will be asked to make its contribution, but will not be asked to contribute everything. To deal with the inflationary problems which confront us, to avoid a disastrous depression, requires delicate handling of our entire situation and careful consideration of the interests of all—including farmers, laborers, and businessmen. Your government is well aware of that necessity. Business should face the future with confidence, determination and hope. Let us not be afraid of shadows. Our shadows fall behind us when we face the light."

There was not much in these innocuous statements the visiting executives could sink their teeth into, and the disappointment evinced by some of the guests over the secretary's remarks was understandable. Equally understandable was the enthusiasm with which they greeted the appearance of Charles F. Kettering, General Motors research consultant, who has a way of expressing his basic philosophy over and over again but each time making it sound even better than the last. It is impossible to put Kettering into print, any more than you could put Jack Benny or Fred Allen into print. Each in his own way is a master at the timing of words and expressions.

However, the substance of Boss Ket's cheerful rendition was that the production of 100 million vehicles marked no particular terminal point in progress, rather it was simply a hilltop from which the future could be viewed—a future limitless as man's imagination.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,236	366,207
February	399,471	393,636
March	519,154	443,588
April	462,323	445,138
May	359,996	404,190
June	454,401	421,466
July	489,736	400,944
August	478,146	364,958
September	437,181	444,500
October	516,843	461,586
November	494,700*	417,492
11 mos.	5,034,000*	4,563,655
December		492,819
12 mos.		°5,056,474

* Preliminary.

Estimate for week ended:

	1948	1947
Nov. 27	90,039	84,391
Dec. 4	125,170	110,759
Dec. 11	125,182	117,902
Dec. 18	120,000	120,657

Estimated by Ward's Automotive Reports

New Pontiacs Previewed

PRESS peep at the 1949 Pontiacs last week drew the usual nods of approval over the division's acknowledged ability to combine beauty of line with high value for the dollar into a single neat package. While details of the car are being withheld until production is under way Jan. 10, it is no secret that body types are the same as those appearing in the Oldsmobile 76 series, including two 4-door sedans, one with streamlined back, and one with notched back, a 2-door sedan with streamlined back, a business coupe, a convertible and a station wagon. The so-called torpedo line of models is being discontinued in favor of a new chieftain series, and both six and eight-cylinder power plants will be offered. Hydramatic drive option will remain, and it is reported that over 70 per cent of the 1948 models built thus far have carried this feature.

Backlogs High, Despite "Water"

ONE of the first estimates of the amount of "water" in new car order backlogs came from Pontiac general manager, H. J. Klingler. He figures that not over 60 per cent of current backlogs are sure sales, but even washing out 40 per cent of Pontiac's orders would leave enough on the books to assure 18 months' produc-

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NEW FUTURAMIC: Four-door sedan from the 1949 Oldsmobile "98" line illustrates the styling of this GM model. All 8-cylinder Futuramic Oldsmobiles for 1949 are powered by the new 135-horsepower "rocket" high-compression engine. Hydramatic drive is standard equipment

tion, since the division this year will build approximately 245,000, and hints cautiously at 10 per cent more for 1949. Mr. Klingler reported demand definitely dwindling for station wagons and convertibles, and predicted that before long most station wagon bodies would be changed from wood to steel construction. Pontiac will close out 1948 model production Dec. 23.

GM Installs Teletype System

CLAIMING to be the first industrial company to use such a system, General Motors has cut in a new fully automatic private wire teletype system reaching its plants in 46 cities throughout the United States and Canada, with connections to many other points in those areas. The hookup will expedite GM communications between various plants, offices and warehouses, and between them and the central office in Detroit. It is a two-way system, permitting stations to send and receive simultaneously.

A perforated paper tape controls electrical impulses which spell out messages, the system being capable of handling about 1,360,000 words, sent and received, daily. All calls are routed through the central office to their destination. For example, a message from Chevrolet-Baltimore to New Departure at Bristol, Conn., is flashed to Bristol via Detroit. Transmission time between all points on the network is about 2 seconds when intermediate circuits are clear.

Three principal units of equipment are employed in the automatic switching center at Detroit. One receives from 14 incoming lines, another sends on as many outgoing lines. A third is a mechanical "traffic director," scanning the addresses of messages and routing them to their proper destination. The latter unit also shows whether traffic is light or heavy on the various circuits. When the circuits are open, the perforated tape goes directly through the machine, when traffic is heavy, the tape becomes slack and loops downward, the size of the loop thus indicating traffic conditions on each circuit. When unduly heavy traffic is indicated, additional equipment is cut into service.

Starts New Scheduling System

SUPPLIERS report Ford has instituted a new system for paper work involved in scheduling the ordering and release of parts, in the effort to trim inventories to a 15-25 day period. This calls for freezing production schedules after Jan. 1 and giving firm commitments for December, January and February releases. Vendors are protected on materials purchases for some time ahead. The arrangement calls for a considerable amount of new scheduling forms issued to suppliers, some of whom are a little dizzy over trying to figure them out. However, it is felt the plan marks a step forward in parts purchasing and scheduling, and in the long run will work to the advantage of both suppliers and Ford.

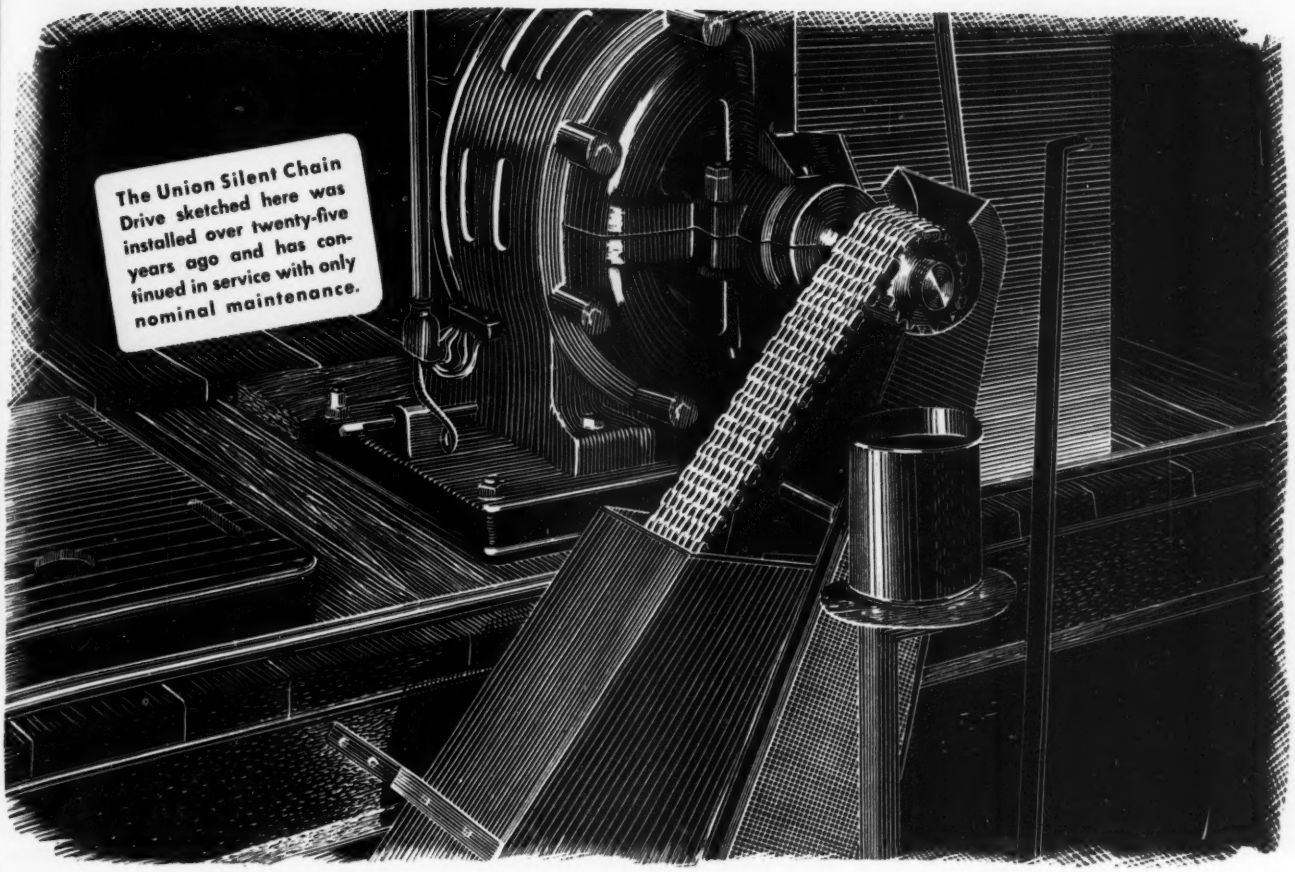
Work has been speeded on the new Ford dynamometer building, first section of the new research center announced by the company a year or more ago, and it should be ready for operation in the near future. Hints are also heard that plans for an entirely new motor building at the Rouge Plant are jelling and may be ready for announcement sometime in the near future.

Union Snipes at Ford

A MINOR ruckus has been generated in labor ranks at the Rouge Plant by a small group of malcontents who have been distributing leaflets to employees outlining charges of "speed-ups" in various departments, centered in the Motor Building. Local 600 of the UAW-CIO has denounced that accusation as phony and the work of alleged "double-talk artists of the Communist Party." The union urges objectors to work standards to follow through accepted procedures in having such standards checked with company representatives, and cites cases where this method has amicably adjusted differences of opinion over standards.

Other elements in the UAW ranks at Ford are sniping at different phases of company policy, such as the layoff of tool and die workers and the unwillingness to hire UAW maintenance crews on construction work within the plant. The whole pattern of discontent, while not unusual in any plant hiring UAW help, appears to be building up to a greater degree than elsewhere in the industry. Possibly it is the forerunner of rumored plans to make Ford bear the brunt of union demands for fourth-round wage increases next summer. The union moved in on General Motors in 1946, and on Chrysler this year, now they figure it is Ford's turn.

A decline in the cost-of-living index of Oct. 15, announced by the Bureau of Labor statistics late in November, which will likely be followed by a further slight decline in the next check on the index, could deflate any serious efforts to build up a case for more wage increases in 1949. General Motors' union contract runs through to 1950 and is definitely geared to the price index until that time, so no adjustments are in prospect for GM's wage scale, except for the "annual improvement factor" of 3 cents an hour which is automatic. However, a further decline in the price index may result in a downward shift in basic rates. Officially, the UAW states: "General Motors workers expectantly look forward to further declines in the price level in the following months and urge that every public and government pressure be exerted toward that end." Of course, as the union doubtless will readily admit, price declines can be overdone.


The Union Silent Chain Drive sketched here was installed over twenty-five years ago and has continued in service with only nominal maintenance.

What's Interesting About UNION CHAIN'S Performance?

Union Chains for Every Application

Drive and Conveying Chains and Sprockets

- Bridge Chain
- Combination Malleable Iron and Steel Chain
- HB (hardened bearing) type chain
- BP (bar and pin) type chain

★

Finished Steel Roller Chains and Sprockets

- All manufacturer's standard, size ⅜ in. to 2½ in. pitch
- Single and Multiple Strands
- Extended Pitch Series in sizes 1¼ in. to 4 in. pitch

★

Silent Chain and Sprockets

- All sizes ⅜ in. to 1½ in. pitch

★

Flexible Couplings

- Roller chain type
- Silent chain type

Just this. Most chain users who have given UNION Chain a fair trial have become regular UNION customers. Perhaps this is the reason:

The Union Chain Plant, Management, Personnel, Engineering, Raw Material, Supervision, Manufacture, Selling and Shipping are solely devoted to but one consideration—better chain. UNION manufactures a complete line of steel sprocket chains and attachments for power transmission and materials handling—**nothing else.** This specialization all along the line results in an end product performance which makes its own friends.

The Union Chain and Manufacturing Company

TRANSMIT POWER UNION CHAINS CONVEY MATERIALS

Sandusky, Ohio, U.S.A.

Ryerson Expands

Steel service firm enlarges Chicago unit with an addition to serve as plant and office

PROBLEM of steel distribution, major headache in the industry, may be eased somewhat with the expansion and improvement program planned by Joseph T. Ryerson & Son Inc. in Chicago, first unit of which will be an 118,000-sq ft addition to serve as a plant and office.

The new building, an L-shaped structure, will be erected at 15th and Rockwell Sts., becoming a part of the north unit of Ryerson's three-block Chicago plant. Including the addition now under way, about 1 million sq ft of floor space are provided at this plant. Total ground area in the Chicago property is about 24 acres. When the new building is completed, the overall plant will have a capacity of from 75,000 to 100,000 tons of steel and will be the largest steel service facility in the world.

Sheets and Bars—Stocks to be carried in the new building will consist largely of steel sheets and bars. Equipment for handling, cutting and dispatching will be installed. The structure will house personnel of the reinforcing bar and other departments. The change is expected to facilitate greatly the handling of bar steel orders.

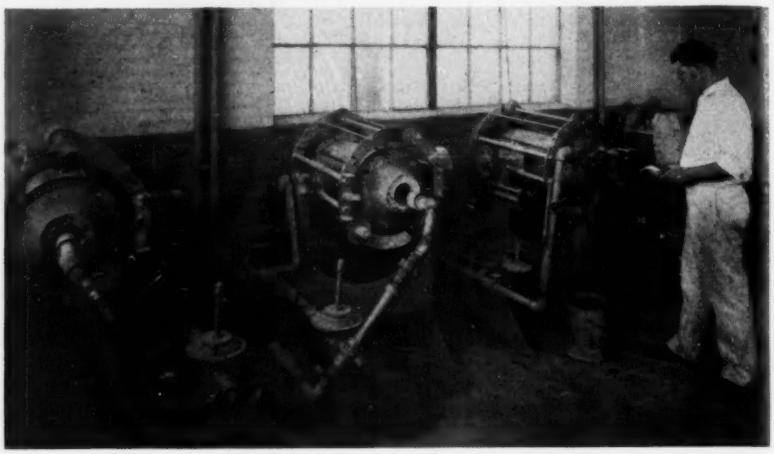
Ryerson was founded in 1842, and its stocks consisted largely of horse shoes, boiler and sheet iron, English and German steel and buggy springs and axles. In 1845 a larger building was acquired on Lake Street in what is now the loop. A still larger plant, obtained in 1853, was occupied until the Chicago fire of 1871. In 1882 the business moved again, to Milwaukee Ave. The first building of the present Chicago plant was erected in 1902. Six years later the entire operations were moved there.

Ryerson acquired a New York plant in 1911. St. Louis was next, in 1914, followed in later years by additional facilities at Detroit, Buffalo, Cincinnati, Milwaukee, Boston, Cleveland, Philadelphia, Pittsburgh, Los Angeles and San Francisco. Recent additions to the Cleveland and Philadelphia plants are practically doubling the size of these units.

New Owners Change Plant Name

UNDER the name of McCarthy International Tube Corp., the former tube mill division of Detroit Tube & Steel Co. will be owned and operated by Glenn McCarthy, Houston, Tex., oil man, and International Rolling Mill Products Corp., Chicago. The division was bought from Sharon Steel Corp., Sharon, Pa., on Dec. 2.

In announcing completion of the transaction, Mr. McCarthy, the new firm's president, confirmed earlier speculation (STEEL, Nov. 1, p. 50) that much of the plant's future output would be of oil country goods, particularly drill pipe and oil well casing. Noting that the projected output level of 4000-5000 tons a month is well above the plant's present rated capacity, E. M. Ray, vice president of International and treasurer of the new company, stated the firm's volume will be increased by concentration on the largest size products of the facility, up to 5½ inches in diameter. G. M. McGranahan is secretary of the new company, headquarters of which are at Detroit.



COMPLETES NEW LABORATORY: Pemco Corp., Baltimore, has completed a new $50,000 research and development laboratory. Photo shows engineer feeding porcelain enamel frit formula to one of seven new experimental rotary smelters

Duquesne Buys Hamilton Steel

FORT DUQUESNE Steel Co., Pittsburgh, has purchased majority stock control of Hamilton Steel Co., Cleveland.

Harry K. Hamilton, founder and president of Hamilton Steel Co., will continue as president, and Donald C. Lott, president of the Pittsburgh firm, has been elected chairman of the board of directors. E. W. Harwell, until recently assistant manager of warehouses for Jones & Laughlin Steel Corp., has been elected vice president and general manager.

Fort Duquesne specializes in the processing and distribution of flat rolled carbon sheet and strip steel, while Hamilton is a distributor of bars, tubing, stainless and carbon sheets and other products. Hamilton is also distributor of aluminum sheet and bars for Reynolds Metals Co.

New Britain Machine Buys Lucas

PLANT and certain other assets o Lucas Machine Tool Co., Cleveland have been purchased by New Britain Machine Co., New Britain, Conn. R. S. Howe, vice president of the latter firm, has announced.

Foundry Work Made Easier

ELIMINATION of more than a doz en heavy lifting hand operations a the East Springfield, Mass., foundry of Westinghouse Electric Corp. has been made possible by a number o mechanical devices installed as par of a $1,250,000 modernization program.

Completely mechanized "shake out" of sand and castings from the poured molds alone eliminates the handling of 65 tons daily by each of five operators. Installing 4500 fee of conveyor lines running through and around the building has further lightened worker loads.

Further improvement in working conditions has been effected with a ventilation system which produces a complete air change every seven minutes. In addition, six wet and dry type dust collectors draw air at 3 dust producing points and extract about 3800 lb of dust every day.

Rockwell Buys Acro Electric

GROUP of Pittsburghers, headed by Willard F. Rockwell Jr., president of Rockwell Mfg. Co., Pittsburgh, has purchased Acro Electric Co., Cleveland, manufacturer of rolling sprin switches. Acro employs about 150.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

United Steel Sales Co., Detroit, steel warehousing and processing firm, has purchased for $341,000 a war surplus plant at Toledo, O., formerly occupied by National Supply Co. The facility, which was operated during the war for production of marine reduction gears, will be used by the new owner as a distribution center.

—o—

Porcelain Enamel Institute estimates the dollar volume of porcelain enameled steel plumbing fixtures soared to $47 million in 1948, an alltime high.

—o—

Noblitt-Sparks Industries Inc., Columbus, Ind., manufacturer of auto heaters and radios, will expand its line to include television sets. Television units will be made in the company's Columbus plant, but it will be some time before production is actually under way.

—o—

Zenith Radio Corp., Chicago, has purchased Rauland Corp., Chicago, manufacturer of cathode ray tubes for television receivers. Rauland tube-making facilities will be doubled. E. N. Rauland will continue as president of the firm.

—o—

Duplex Printing Press Co., Battle Creek, Mich., is now in process of liquidation. Its physical facilities have become part of Duplex Division, Goss Printing Press Co., Chicago.

—o—

United Helicopters Inc., Palo Alto, Calif., will soon begin production of a helicopter selling for $19,995. Distributor deliveries will commence next February.

—o—

William Jessop & Sons Ltd., Sheffield, England, producer of tool steels, has appointed L. E. Zurbach Steel Co., Somerville, Mass., as a distributor.

—o—

Armco Steel Corp., Middletown, O., reports that its Fabricating Division has worked more than 1 million work-hours without a major accident and that the record is still growing.

—o—

Walsh Refractories Corp., St. Louis, manufacturer of fire brick, glass industry refractories and high temperature specialties, has bought property adjacent to its plant and will build an office and warehouse. Completion is scheduled in about 90 days.

—o—

Odenbach Shipbuilding Corp. has purchased a barge-building facility at Greene, N. Y., from War Assets Administration for $250,000. Odenbach was the wartime operator of the plant which consists of 200,000 sq ft of space.

—o—

E. I. du Pont de Nemours & Co., Wilmington, Del., has repurchased a neoprene synthetic rubber plant at Louisville, Ky., from Reconstruction Finance Corp.

—o—

Lofland Steel Co., Dallas, Tex., fabricating firm, has purchased one of the Dallas properties of Southland Steel Co. in an expansion move. Lofland will begin operating at the new location, at 5219 Maple Ave., after the first of the year. A new office building will be erected. Southland will continue to operate its other plant at Lamar and Forest avenues.

—o—

Bingham-Herbrand Corp., Toledo, O., producer of stampings and forgings, has opened a divisional sales office at 551 Fifth Ave., New York, under the direction of Dave A. Coulter and another one at 2500 W. Sixth St., Los Angeles, to be in charge of Albert R. Said.

—o—

Willys-Overland Motors Inc. has purchased manufacturing facilities at Toledo, O., from War Assets Administration for $861,881. Included in the transaction are two multiple story buildings with combined floor areas of 837,000 sq ft, a power substation and high line extension serving the properties. During the war, Willys operated the buildings which are intermingled with its private properties.

—o—

Thorrez & Maes Mfg. Co., Jackson, Mich., maker of screw machine products, has been dissolved, its machines, material and buildings sold. A new company has been formed, C. Thorrez Industries, which will be a group of small plants.

—o—

Rockwell Mfg. Co., Pittsburgh, announced that district offices for its Pittsburgh Equitable Meter and Nordstrom Valve Divisions will be located at 25 Beale St., San Francisco, and 1102 Delano St., Houston, Tex.

—o—

North American Aviation Inc., Inglewood, Calif., has received contracts for 20 reconditioned AT-6 trainers for Venezuela and three for the Philippines. Company also has contracts for 30 AT-6's for Argentina and 42 for Siam.

—o—

Sprague Electric Co., North Adams, Mass., through Herlec Corp., a subsidiary, has acquired possession of an automatic machine for the production of vitreous enamel capacitors. Machine was under development by E. I. du Pont de Nemours & Co. prior to the war and completed by the Army Signal Corps.

—o—

General American Transportation Corp. announces that the following departments have been moved from 209 W. Jackson Blvd. to its new location at 131 S. Wabash Ave., Chicago: Field Erection Division, Engineering Department and the purchasing department for the Plate & Welding Division, Process Equipment Division and Plastics Division.

—o—

Revere Copper & Brass Inc., New York, reports production of copper clad stainless steel cooking utensils has started at its plant at Riverside, Calif., acquired early this year.

—o—

Richards Machine Tool Co., manufacturer of machine tools and micrometers has changed its name to Rimat Machine Tool Co. and has moved to new and larger quarters at 1117 Air Way, Glendale, Calif.

—o—

Cannon Electric Development Co., Los Angeles, maker of plugs, solenoids and electrical specialities, has appointed Leroy W. Beier, manufacturers' representative in Chicago, as its sales agent for northern Illinois, northern Indiana and eastern Iowa.

—o—

Twin Coach Co., Kent, O., has received a $6 million order for wings and control surfaces from Grumman Aircraft Co. About $500,000 will be used to retool the company's Buffalo plant where the parts will be made. Retooling will be completed next February, with production to begin late that month and to continue until August, 1950.

—o—

Rigid-Tex Corp., Buffalo, producer of design-strengthened and textured stainless steel, aluminum and other ferrous and nonferrous metals, has changed its name to Rigidized Metals Corp. to better link the corporate name with the product.

—o—

War Assets Administration is offering for sale a synthetic ammonium sulphate plant at Salem, Oreg. The plant has an annual capacity of 75,000 tons and is adaptable to an increase in this capacity or to additions for production of fertilizer components.

The Business Trend

LEVELING off one point below the postwar peak, STEEL's industrial production index for the week ended Dec. 11 registered a preliminary 178 per cent of the 1936-1939 average, matching activity of the preceding week. With exception of the Thanksgiving holiday week, industrial activity has been at high levels since the end of September despite unsettling factors in individual industries at various times.

STEEL—During this 11-week period, weekly production of steel for ingots and castings has averaged 98.6 per cent of capacity. These reports of steelmaking activity show that the steel industry is operating at an unprecedented pace. Output for the week ended Dec. 11 was 100 per cent of capacity for the second consecutive week.

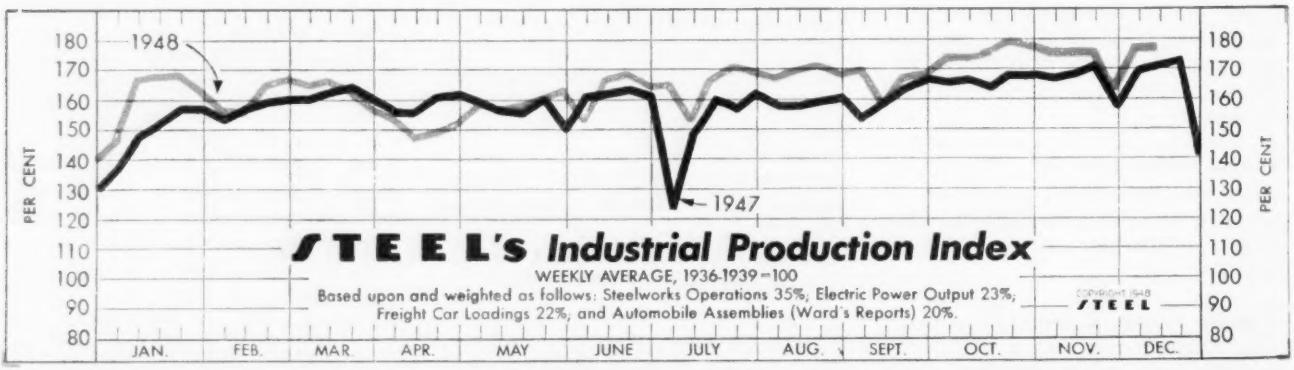
AUTOMOBILES—Also contributing materially to the current high level of industrial activity, the automobile industry produced 125,182 passenger cars and trucks during the week ended Dec. 11 and set a new postwar record for the second consecutive week. Outturn for the week was 12 units higher than the revised total for the week ended Dec. 4. However, some slowing is being experienced in demand for trucks and predictions for 1949 indicate a decline of 10 to 15 per cent in output. A buyers' market is present in all but the light models and the industry expects this condition to work its way down into this classification, in appreciable degree, in the next several months.

COAL—Bituminous coal output for the week ended Dec. 4 was 11,350,000 net tons, almost 2 million tons less than the aggregate for the corresponding week last year. Although coal production has been below 1947 levels in the last few months, stockpiles are at postwar peaks and reports from coal mining districts tell of shorter working hours and layoffs.

INCOME—Personal income was at an annual rate of $215.6 billion in October compared with the September figure of $214.9 billion, according to Department of Commerce. During October, factory payrolls were unchanged as increases in durable goods wages were countered by a decline in nondurable manufacturing wages.

INVENTORIES—Total business inventories increased about $700 million over the September figure and reached $54.4 billion at the end of October. Department of Commerce reports, however, that after seasonal adjustment there was no change in inventories over the preceding month. Retail trade accounted for over $500 million of the unadjusted increase while manufacturing and wholesale inventories each rose about $100 million.

CONSTRUCTION—Latest joint estimate of the Departments of Commerce and Labor brings value of new construction put in place during the first 11 months of this year to $16.3 billion, 29 per cent above the comparable 1947 period. New construction put in place in November is valued at $1,559,000,000, representing a drop of 9 per cent from October but 9 per cent above the November, 1947, total.



Index (chart above): Week ended Dec. 11 (preliminary) 178 Previous Week 178 Month Ago 176 Year Ago 171

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	100.0	100.0	99.0	97.5
Electric Power Distributed (million kilowatt hours)	5,705	5,646	5,571	5,327
Bituminous Coal Production (daily av.—1000 tons)	1,892	1,666	1,707	2,187
Petroleum Production (daily av.—1000 bbl.)	5,620	5,615	5,626	5,253
Construction Volume (ENR—Unit $1,000,000)	$83.7	$362.3	$137.8	$95.6
Automobile and Truck Output (Ward's—number units)	125,182	125,170	116,029	117,902

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons.

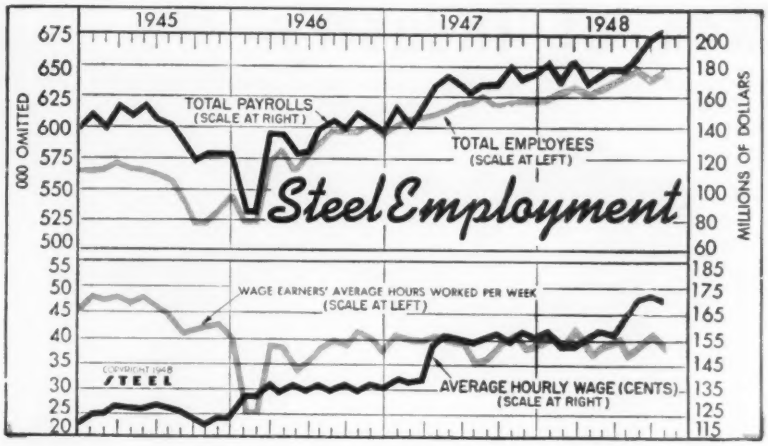
TRADE				
Freight Carloadings (unit—1000 cars)	805†	804	872	854
Business Failures (Dun & Bradstreet, number)	122	126	96	87
Money in Circulation (in millions of dollars)‡	$28,415	$28,322	$28,337	$28,874
Department Store Sales (changes from like wk. a yr. ago)‡	−5%	−5%	−8%	+7%

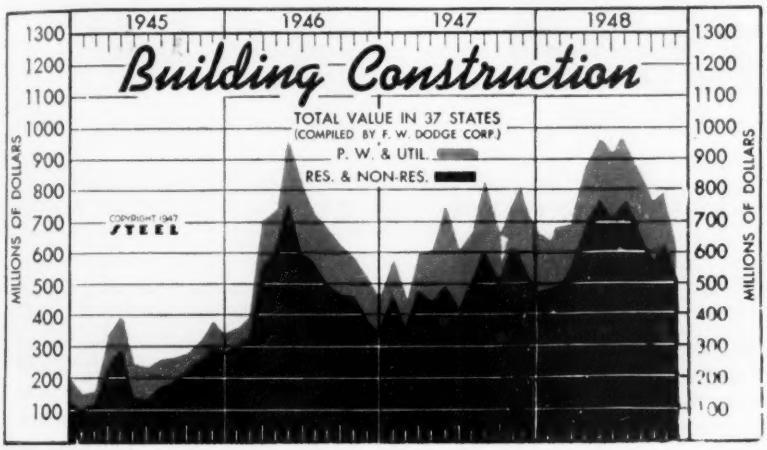
† Preliminary. ‡ Federal Reserve Board.

Steel Employment

	Employees† (000)		Total Payrolls (millions)		Hourly Wages† (cents)	
	1948	1947	1948	1947	1948	1947
Jan.	622	601	$180.2	$155.8	157.3	138.1
Feb.	626	607	167.6	139.5	155.1	137.0
Mar.	629	609	183.0	150.6	154.8	137.9
April	626	611	168.5	168.3	155.1	153.3
May	628	615	175.3	175.8	157.7	155.6
June	634	623	179.5	167.6	156.9	154.7
July	641	623	179.8	163.2	164.5	153.9
Aug.	645	625	193.8	169.1	168.9	155.6
Sept.	641	618	199.4	168.9	171.8	157.1
Oct.	644	620	201.7	180.1	169.9	154.6
Nov.	...	624	....	171.0	....	158.7
Dec.	...	621	....	175.3	....	156.5

† Monthly average.





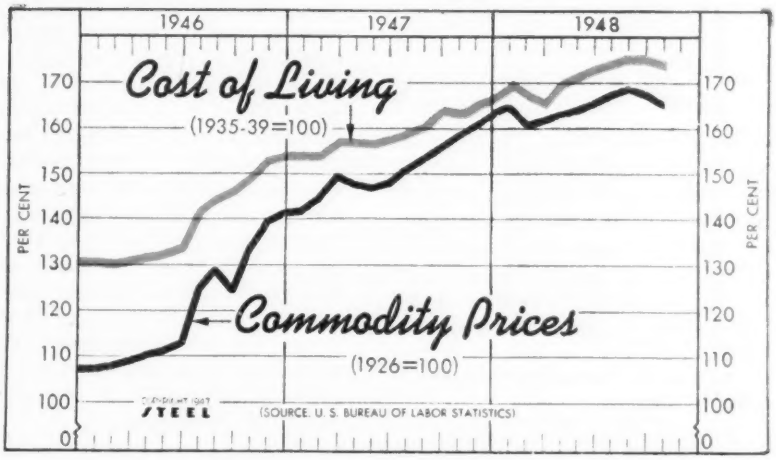
Construction Valuation in 37 States

(Unit—$1,000,000)

	Total	Public Works Utilities		Residential and Non-residential	
	1948	1948	1947	1948	1947
Jan.	615.2	136.6	113.9	478.6	457.7
Feb.	682.0	177.3	90.5	504.6	351.6
Mar.	689.8	164.3	122.0	525.5	474.8
Apr.	873.9	184.7	161.4	689.2	441.0
May	970.8	205.0	252.9	765.8	490.0
June	935.2	215.7	185.7	719.5	419.4
July	962.7	217.9	165.9	744.8	494.4
Aug.	854.1	207.8	223.5	646.3	599.7
Sept.	762.2	202.7	141.5	559.5	508.4
Oct.	778.6	165.5	165.9	613.1	627.4
Nov.	611.2	106.9	181.5	504.3	533.6
Dec.	....	....	154.1	....	471.3
Totals	...	....	1,958.8	....	5,869.3

Wholesale Commodity Price—Cost of Living Indexes

	—Commodities— (1926=100)			—Living Cost— (1935-39=100)		
	1948	1947	1946	1948	1947	1946
Jan.	165.7	141.5	107.1	168.8	153.3	129.9
Feb.	160.8	144.5	107.7	167.5	153.2	129.6
Mar.	161.4	149.5	108.9	166.9	156.3	130.2
Apr.	162.7	147.7	110.2	169.3	156.2	131.1
May	163.9	147.1	111.0	170.5	156.0	131.7
June	166.2	148.0	112.9	171.7	157.1	133.3
July	168.7	150.8	124.7	173.7	158.4	141.2
Aug.	169.5	153.7	129.1	174.5	160.3	144.1
Sept.	168.6	157.4	124.0	174.5	163.8	145.9
Oct.	165.0	158.5	134.1	173.6	163.8	148.6
Nov.	....	159.7	139.7	....	164.9	152.2
Dec.	....	163.2	140.9	....	167.0	153.3
Ave.	....	151.8	120.9	....	159.2	139.3



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$14,010	$12,543	$13,350	$13,786
Federal Gross Debt (billions)	$252.4	$252.6	$252.4	$258.0
Bond Volume, NYSE (millions)	$16.6	$16.5	$17.8	$34.2
Stocks Sales, NYSE (thousands)	6,281	6,352	6,972	5,911
Loans and Investments (billions)†	$62.3	$62.5	$62.2	$65.0
United States Gov't. Obligations Held (millions)†	$33,075	$33,073	$33,268	$37,560

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$95.50	$95.50	$95.05	$76.09
STEEL's Nonferrous Metal Composite‡	232.6	232.6	228.8	179.4
All Commodities†	163.7	165.1	164.2	162.6
Metals and Metal Products†	173.8	173.8	172.6	151.0

† Bureau of Labor Statistics Index, 1926=100. ‡ 1936-1939=100.

Men of Industry

JOHN P. WILKINSON

JAMES M. LEWIS

N. GEORGE BELURY

Lewis Foundry & Machine Division, Blaw-Knox Co., Pittsburgh, announces the appointment of **John P. Wilkinson** as assistant to the president, and **James M. Lewis** as manager of roll sales for the division. Mr. Wilkinson has been employed in the steel industry in the United States for 12 years. He recently supervised the installation in Mexico City of a new merchant mill for Aceros Nacionales. Mr. Lewis has been with Blaw-Knox Co. since 1931, and has been connected with the roll industry for 25 years.

—o—

Detroit Broach Co., Detroit, announces the appointment of **Henry T. Schlachter** as its representative in southern Ohio and northern Kentucky. Mr.Schlachter has a broad experience in the cutting tool field. He was formerly midwestern field manager of the Cimcool Division, Cincinnati Milling Machine Co. His headquarters will be in Cincinnati, 426 Transportation Bldg.

—o—

Carl K. Gieringer has been elected president, Cincinnati Time Recorder Co., Cincinnati. **C. F. Steinmetz** has been elected vice president, and **Nicholas Bauer,** secretary. Mr. Gieringer, inventor and engineer, was formerly on the faculty of the University of Cincinnati. Simultaneous with his election as president was the announcement that Mr. Gieringer was purchaser of the majority interest of the Cincinnati company from the Walter E. Schott group.

—o—

Topflight Tool Co. Inc., York, Pa., announces that **William H. Wagner** has been appointed aircraft tool production engineer in the company's plant at York. He formerly was with Fairchild Engine & Airplane Corp., Hagerstown, Md., and Consolidated Vultee Aircraft Corp.

—o—

Lincoln Electric Co., Cleveland, announces recent appointments and changes in its district managers: **C. W. Lytton** has been made district manager for the Buffalo area. He has been associated with the company in various positions since 1931, and has been district manager of the northwestern Pennsylvania district, with offices in Franklin, Pa. **C. M. Richardson** has been appointed district manager of the northwestern Pennsylvania district, succeeding Mr. Lytton. Mr. Richardson nas been district manager at Toledo, O., for the past six years. He joined Lincoln Electric in 1936. **Ray Zeh** has been appointed district manager at Toledo, succeeding Mr. Richardson. He has served the company for the past 10 years at Milwaukee in the sales engineering department.

—o—

Gerald J. Klopfenstein has been appointed to the newly created post of assistant to the vice president and director of sales, Bowser Inc., Fort Wayne, Ind., and **James E. Doelling** has assumed Mr. Klopfenstein's former position as manager of the Meter Sales Division. Mr. Klopfenstein has been associated with Bowser Inc. for the past 25 years, Mr. Doelling since 1937.

—o—

Walter H. Stellner has been named vice president of merchandising, and **Elmer H. Wavering,** vice president of product design for Motorola Inc., Chicago. Mr. Stellner was formerly vice president in charge of home radio and television set design, and Mr. Wavering, vice president, in charge of automotive product design. Under the new organizational structure, Mr. Wavering will be responsible for consumer product engineering—home radios, auto radios, television sets and car heaters. Mr. Stellner will supervise all merchandising, including sales, advertising, market research, and service.

—o—

N. George Belury has been appointed president, Engineered Castings Division, American Brake Shoe Co., at Rochester, N. Y. Associated with the company since graduating from Purdue University in 1937, Mr. Belury was formerly division vice president, and has also served in various sales capacities with Engineered Castings Division, including that of sales manager.

—o—

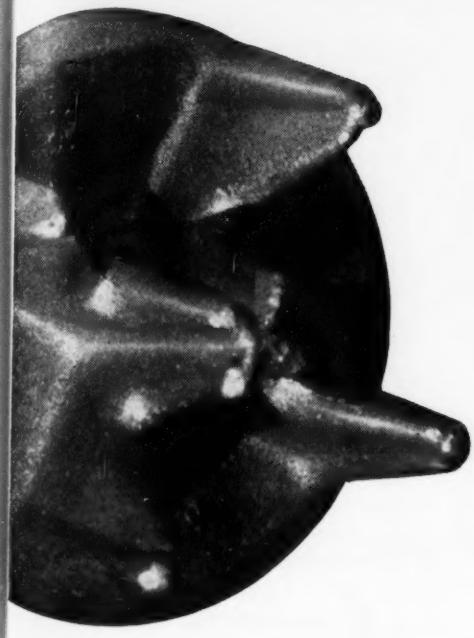
Elmer E. Sheldon has been appointed staff assistant to the manager of manufacturing, construction materials department, General Electric Co., at Bridgeport, Conn. Mr. Sheldon, who was formerly quality control engineer of the Wire & Cable Division, joined the company in 1937 and was for a number of years in test engineering for the Wire & Cable Division.

—o—

W. T. Scharfenaker, formerly associated with the South Works of Carnegie-Illinois Steel Corp. in Chicago, has been appointed superintendent of the brick mason department of Midland Works, Midland, Pa., Crucible Steel Co. of America.

—o—

John M. Downie has been named per-



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Timken stainless steel forgings machine uniformly, too—fast, easily, with a good surface. No need to change your machining practice with every heat. Scrap loss is cut—machining time saved. The high quality of your finished product never varies.

What are the reasons for this outstanding uniformity of Timken stainless steel forging bars? 1. Specialized skill of Timken metallurgists, developed through years of experience in the production of fine alloy steels. 2. Precise quality control from melting to final inspection. 3. The Timken Company's long-time leadership in alloy steel research. 4. Special practices which are practical only in a large, flexible specialty mill.

For help in selecting the correct analysis of Timken stainless steel to meet your specific requirements, call upon the services of the Technical Staff, The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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Fine Alloy

STEEL

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Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing

sonnel director of McKinney Mfg. Co., Pittsburgh, manufacturer of builders' hardware. He formerly was personnel manager, Richmond Radiator Co., Uniontown, Pa., and previously served as chief of the Engineering Division, Redstone Arsenal, Huntsville, Ala.

—o—

Two plant managers who have been elected to the board of directors of Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., are **M. L. Douglas,** manager of the plant at Coraopolis, Pa., and **Foster E. Fike,** manager of the plant at Rock Falls, Ill. **L. R. McWeeney,** who is at the Port Chester plant, has been elected vice president and assistant secretary of the company.

—o—

Howard E. Hornickel has been appointed assistant superintendent of the Donora, Pa., zinc works of American Steel & Wire Co., U. S. Steel Corp. subsidiary. **Jesse K. Miller,** works chemist, will assume the additional duties of works metallurgist, which Mr. Hornickel relinquishes to accept his new post.

—o—

J. R. Patterson, vice president in charge of sales for Mackintosh-Hemphill Co., Pittsburgh and Midland, Pa., has been named chairman for district No. 4 and a national director of Steel Founders' Society of America.

—o—

Warren H. Williams has been elected district sales manager of the Detroit office of Inland Steel Co., effective Jan. 1 following the retirement of **John H. Fitch** from that position. Mr. Fitch, who retires Dec. 31 under the company's pension plan, was honored Dec. 16 at a testimonial dinner in the Detroit Athletic Club. **Harris S. Currier** has been named assistant district sales manager. Mr. Fitch joined Inland in 1932, and prior to that was vice president and sales manager, Newton Steel Co. Mr. Williams was formerly assistant district sales manager of the Detroit office, and Mr. Currier sales representative.

—o—

Orrien K. Lynn has been named manager of the Seattle district of the Replacement Tire Sales Division, B. F. Goodrich Co. He succeeds **Gerald A. Geer,** who has been assigned other duties. Mr. Lynn has been with Goodrich 22 years.

—o—

Philip Diamond has been elected to the position of application engineer, International Rectifier Corp., Los Angeles. He had previously served with Westinghouse Electric Corp. in its switchboard design section, and had been connected with Stone & Webster Engineering Corp.

—o—

A. S. Thaeler has been named assistant marine engineer, Pittsburgh Steamship Co., U. S. Steel Corp. subsidiary, at Cleveland. He formerly was acting chief engineer of Federal Shipbuilding & Dry Dock Co., Kearny, N. J.

—o—

J. R. Berg, vice president and general superintendent, Mesta Machine Co., Pittsburgh, has been elected vice chairman of the Third District Committee of the National Founders Association. He previously was on the district committee of the foundry industrial group.

—o—

John L. Cook, until recently president, Winter Bros. Co., Wrentham, Mass., manufacturer of taps and dies, and a subsidiary of National Twist Drill & Tool Co., Rochester, Mich., has been elected to presidency of National Machine Products Co., Detroit, which manufactures alloy steel nuts and valve tappet screws. He succeeds the late **Clare L. Brackett,** who died in October, 1948. Mr. Cook still retains the office of vice president and director of National Twist Drill & Tool Co.

—o—

Neal Landy has been appointed advertising director, Stonhard Co., Philadelphia.

—o—

Henry E. Hund has been named chairman of the board of Reo Motors Inc., Lansing, Mich. **Joseph S. Sherer Jr.,** vice president and assistant general manager, was elected president and general manager to succeed Mr. Hund. **James J. Dervin,** vice president and director of purchases, was promoted to vice president and assistant general manager.

—o—

William E. Massey, vice president, Weldit Inc., Detroit, manufacturer of gas welding and cutting apparatus, assumes the additional title of general manager. **Joseph C. Smith,** who has been with the company since 1936, serving in a sales and engineering capacity, has been appointed sales manager of the company.

—o—

G. W. Merrefield has been appointed consulting engineer to the foundry industry by the firm of Giffels & Vallet Inc., Detroit. He served in similar positions with U. S. Steel Corp., Clark Equipment Co., American Radiator Co., Chicago Hardware Foundry Co., and others. He has had over 30 years of experience in foundry operation and design.

—o—

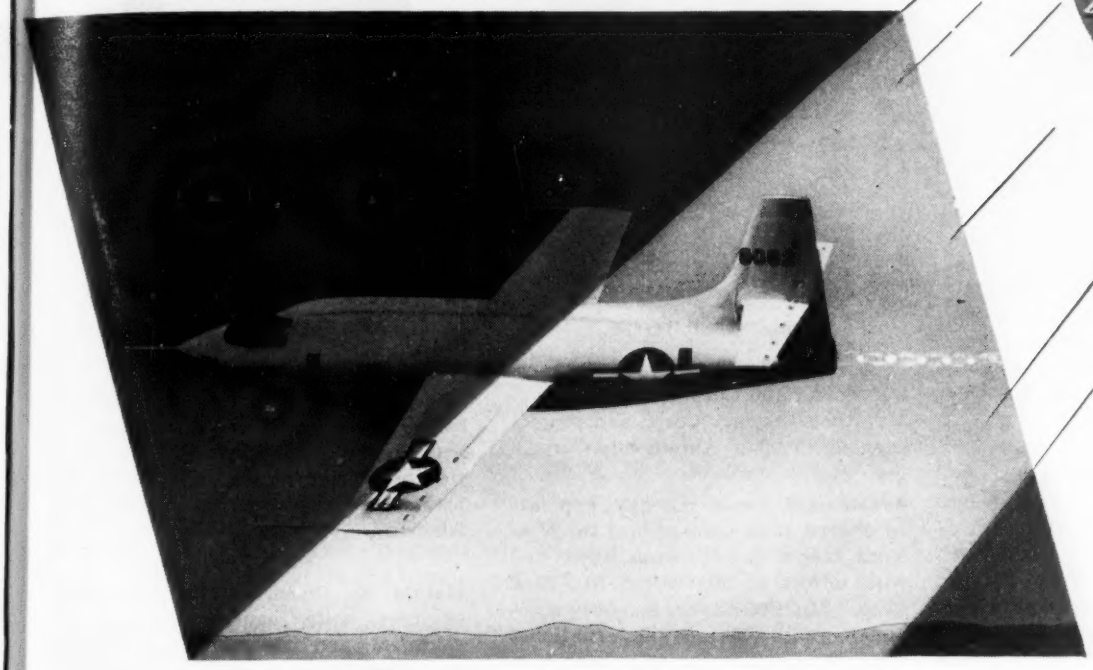
Selden T. Williams, vice president, Scovill Mfg. Co. Inc., was appointed general manager of A. Schrader's Son Division. He joined A. Schrader's Son Inc. in 1929, and in 1944 was appointed vice president, Scovill Mfg. Co. Inc., in charge of manufacturing of Schrader domestic and foreign

WARREN H. WILLIAMS

JOHN H. FITCH

G. W. MERREFIELD

Symbolic of airplanes to come is the X-1, which has flown faster than sound. Some metal surfaces of the X-1 are almost ½" thick.



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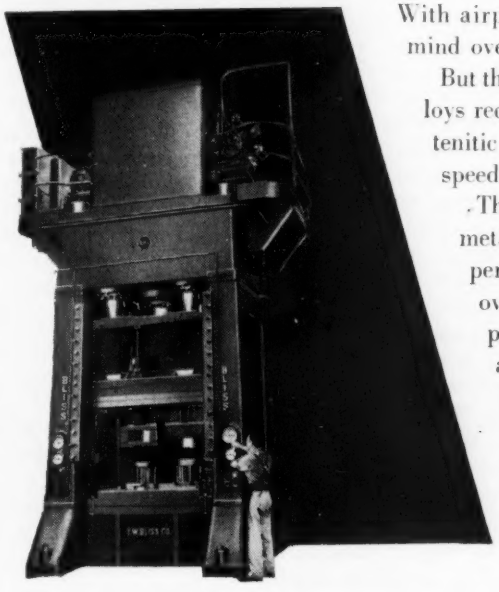
BLISS BUILT

....Just mind over matter



With airplanes it's always been a problem of mind over matter.

But this time the "matter" is the tough, new alloys required to stand tremendous stresses—austenitic steels and others for parts moving at faster speeds and hotter temperatures than ever before.

This time, again, the "mind" is the collective metal working and development engineering experience of E. W. Bliss Company that goes back over 90 years—the keen approach to stamping problems that has always supplied pressed metal answers to the aircraft, automotive, railroad, electrical, and many other industries.

Yes, if you're worried about the "producibility" of your design, Bliss engineers can help. They build more types and sizes of presses than any other company in the world, and they'll dare to pioneer with you in developing new power press equipment to meet new problems as they arise. That's why today Bliss presses predominate throughout the pressed metal field...why the biggest presses for the toughest jobs are Bliss-built ...why your problem will be nearer solution by sending for a Bliss sales engineer today.

Here is a unique example of special press engineering to serve Lockheed Aircraft's specific operating needs. This 1,000-ton Bliss Hydro-Dynamic Press (patented) is a double action machine for deep drawing work. But for the job illustrated, both slides were locked and dies operated against cushions to perform successive operations.

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plants. **W. T. Hunter,** who entered his 50th year of service last June, continues as vice president and director of Scovill Mfg. Co., Waterbury, Conn., and as president, A. Schrader's Son Inc., Brooklyn, N. Y.

—o—

Stratos Corp. of Farmingdale, N. Y., subsidiary, Fairchild Engine & Airplane Corp., New York, announces the election of new officers: **J. Carlton Ward Jr.,** Fairchild board chairman and formerly president of Stratos, was elected to head the Stratos board. **Lawrence B. Richardson,** Fairchild president, was elected president of Stratos, and **Myron B. Gordon,** Fairchild vice president in charge of operations, was elected Stratos vice president. **F. Eugene Newbold Jr.** will assume the post of general manager, Jan. 1.

—o—

Cornelius Van Deusen has been appointed assistant sales manager of V & O Press Co. Inc., Hudson, N. Y., with which he has been connected for the past 14 years. For the last two years he has been located in Chicago as a sales and service engineer covering the central west territories.

—o—

Dr. Wallace E. Gordon has been appointed assistant director of sales in charge of agricultural chemicals, adhesives, resale chemicals, and zinc products in the Grasselli Chemicals Department, E. I. du Pont de Nemours & Co., Wilmington, Del. He succeeds **H. M. Rosencrans,** who died recently. Dr. Gordon previously was sales manager for agricultural chemicals. **Richard W. Thatcher,** formerly sales manager, industrial product development and service section, has been named sales manager of agricultural chemicals, succeeding Dr. Gordon. **Bertel C. Nylen,** formerly manager of the agricultural product development section, becomes sales manager of the industrial development and service section, succeeding Mr. Thatcher; and **Charles J. Krister,** formerly marketing and field development supervisor, succeeds Mr. Nylen.

—o—

Alice H. Drew has been appointed advertising manager, Duro-Test Corp., North Bergen, N. J., maker of industrial lamps and fixtures. **Roland Tiemann** will continue as art director.

—o—

Raymond C. Tegtmeyer has been appointed to succeed **Charles L. Dean** on the instructional staff of the University of Wisconsin, Extension Division. Mr. Tegtmeyer holds the rank of assistant professor of mechanical engineering. He has held a number of positions with industrial organizations, such as senior engineer with

JONATHAN D. FREEZE

HARALD M. OLSON

Curtiss-Wright Corp., chief engineer, Marathon Foundry Corp., and project engineer, Tucker Automobile Corp.

—o—

Jonathan D. Freeze has been appointed district sales manager for the New York territory of Jessop Steel Co., with offices at 30 Church St., New York. Mr. Freeze was formerly associated with Armco International Corp. in various capacities both here and abroad. Most recently he was Chicago representative for Fritz W. Glitsch & Sons Inc. He has also been a sales engineer for U. S. Steel Export Co., and was assistant manager of the Tin Plate Division, Crucible Steel Co. of America.

—o—

John E. Wells has been appointed special sales representative of the newly formed Industrial Parts Division, Reynolds Metals Co., Richmond, Va. He will be located in Detroit. Before joining Reynolds, Mr. Wells was with Avco Mfg. Corp., Detroit, where he was in charge of advertising, service and contracts; sales manager for Aircraft Products Division; and then plant manager of the Horton Division and later general manager. He had previously served with Shaw-Box Crane & Hoist Division; Manning, Maxwell & Moore Inc., Muskegon, Mich.; and with Ex-Cell-O Corp., Detroit.

—o—

Re-election of **F. J. Shepard Jr.** as president, and **W. Van C. Brandt** as vice president of the Electric Industrial Truck Association has been announced by the executive committee of the association. Mr. Shepard is treasurer, Lewis-Shepard Products Inc., Watertown, Mass., and Mr. Brandt is manager of the Motive Power Battery Sales Division, Electric Storage Battery Co., Philadelphia.

—o—

Hugh P. Bigler, executive vice president, Connors Steel Co., Birmingham, has been named Alabama member of the board, National Association of Manufacturers. Mr. Bigler is president, Associated Industries of Alabama.

—o—

Harald M. Olson, water treatment engineer, water equipment designer salesman, and maintenance engineer for over 39 years, has been named consulting maintenance engineer for Morton Salt Co., Chicago, the appointment to be effective Jan. 1. He will continue his water treatment endeavors in the field of municipal, industrial, commercial, institutional and domestic, and home service base exchange water softening as well as in the field of corrosion problems pertaining thereto, and will be available for consultation through Morton Salt Co. on any new projects, and also on problems in the base exchange field or equipment in service. Mr. Olson will continue his activities as general chairman of the Annual Industrial Water Conference, Engineers Society of Western Pennsylvania, Pittsburgh, as he has since its inception in 1940.

—o—

H. G. Johnson, who formerly represented Standard Transformer Co., Warren, O., has resigned in order to assume the duties of New England manager for the I-T-E Circuit Breaker and Railway and Industrial Engineering Companies.

—o—

William J. Healey has been named superintendent of transportation at the Brier Hill Works, Youngstown Sheet & Tube Co., Youngstown. He succeeds **Herbert E. Johnson,** who was appointed superintendent of transportation for the whole district.

—o—

B. A. Holbel has been appointed central office manager for Pontiac Motor Division, General Motors Corp., at

ROBERT T. MAYNARD

Who has been promoted to export manager, Thew Shovel Co., Lorain, O. Noted in STEEL, Nov. 29 issue, p. 68

RICHARD HOAGLAND

Chief engineer, automatic arc welding applications, Acme Pattern & Machine Co. Inc., Buffalo. Noted in STEEL, Nov. 29 issue, p. 68

DR. WILLIAM W. EATON

Appointed to the Central Research Organization, Olin Industries Inc., at New Haven, Conn. Noted in STEEL, Nov. 22 issue, p. 60

Pontiac, Mich. He succeeds **M. C. Goodwin,** who has resigned to become a Pontiac dealer in Grand Rapids, Mich. Mr. Holbel has been with General Motors Corp. for 24 years and with Pontiac Motor Division since 1934. He has been employed in the organization department, as zone office manager, business manager, and as district manager.

—o—

William A. Duncan has been named director of promotion, Enameled Utensil Manufacturers Council. For the past 7 years advertising manager, Hamilton Beach Co., Racine, Wis., he will make his headquarters in the Merchandise Mart, Chicago.

—o—

Dr. Howard E. Mathay has been appointed medical director at the Youngstown district works of Carnegie-Illinois Steel Corp. The post is newly created and is a part of the industrial relations department.

—o—

Dr. T. H. McConica III has announced his resignation as technical assistant to the general manager, Magnesium Division, Dow Chemical Co., Midland, Mich., to devote his full time to the managership of American Ski Co., Clare, Mich., which he organized.

—o—

George B. McMeans has been appointed general superintendent of the Kaiser steel plant at Fontana, Calif., succeeding **C. H. Lenhart,** resigned. Mr. McMeans formerly was assistant general superintendent.

—o—

J. C. Belloni has been appointed Pacific Coast district order service manager for Westinghouse Electric Corp. He formerly was order service supervisor in the San Francisco office.

OBITUARIES . . .

Aaron L. Sonnhalter, 62, former vice president, Crucible Steel Co. of America, in charge of the Midland, Pa., division, died Dec. 10. He had been vice president of the steel company for 15 years before retiring in September, 1947. He later became president of the Midland Water Co.

—o—

Raymond W. Cook, 58, executive vice president, Associated Spring Corp., Bristol, Conn., died Dec. 4. He became associated with the Wallace Barnes Division of Bristol at an early age, and during 40 years of service with the company worked in many capacities. In 1941 he was elected a director of Associated Spring Corp., and executive vice president in 1944.

—o—

Capt. William F. Meister, superintendent of construction, Pittsburgh Steamship Co., Cleveland, subsidiary of U. S. Steel Corp., died Dec. 13 after a short illness.

—o—

Victor L. Mahler, 67, for more than a quarter century vice president, Empire Brass Co., Cleveland, died recently. He retired from the company in 1942 due to ill health.

—o—

Calvin G. Miller, 54, sales engineer and secretary, Darcoid Co. Inc., marine equipment company, New York, died Dec. 11 at Norwalk, Conn.

—o—

John N. Goddard, 81, president, Conklin Tin Plate & Metal Co., Atlanta, died Dec. 10.

—o—

William A. Englehart, 59, salvage engineer, Pontiac Division, Pontiac, Mich., General Motors Corp., died recently.

—o—

William McFarlane, 56, for a number of years assistant experimental engineer for Thompson Products Inc., Cleveland, died recently.

—o—

John E. Henes, 67, president, Signal Electric Mfg. Co., Menominee, Mich., died Dec. 8 at Ann Arbor, Mich.

—o—

Edward P. Dawes, 48, production supervisor of the Elmira Works, Elmira, N. Y., General Electric Co., died recently. He was with the foundry for 23 years.

—o—

Perry Ross, for 27 years a designing engineer for White Motor Co., Cleveland, died recently of a heart attack.

—o—

Benjamin E. Schwartz, 52, senior member, General Tinplate Co., Brooklyn, N. Y., died Dec. 13. He had been in the sheet steel and tin plate business since 1916.

—o—

Henry J. Hughes, president, Robert Pinkerton Boiler Works, Green Island, N. Y., died recently in an automobile accident.

—o—

J. Clarence Rogers, 62, president and treasurer, Crown Stove Works Inc., Cicero, Ill., died Dec. 6.

—o—

Edward M. Johnston, 53, sales representative, Ingersoll Steel Division, Borg-Warner Corp., Chicago, died Dec. 7.

—o—

Charles E. McIlreevy, 65, president, Premier Metal Products Co., Chicago, died Dec. 10 of a heart attack.

FLASH-BUTT WELDED RINGS and BANDS *by* AMERICAN WELDING

Flash-butt welded rings and bands . . . both carbon and alloy . . . prove to be superior. Records show that there is a substantial

SAVING IN THE PRICE OF RINGS
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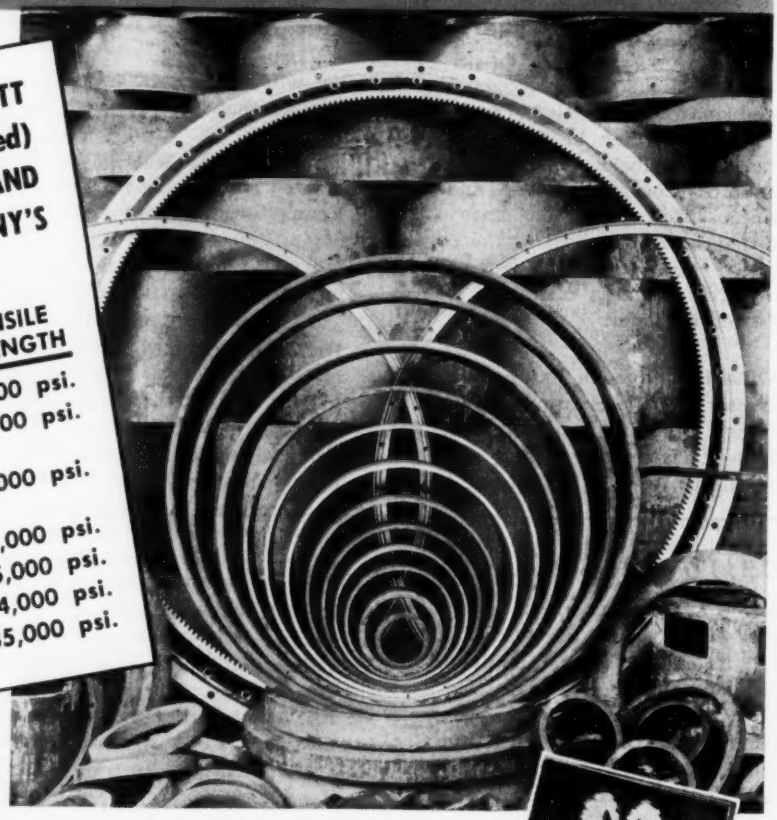
when rings and bands are produced by the American Welding *"Controlled Technique"* process of flash-butt welding.

If you use rings, bands, or any other welded product, send your specifications, quantity, and prints for prompt quotation.

REPRESENTATIVE FLASH-BUTT WELD TEST RESULTS (as welded) FROM AMERICAN WELDING AND MANUFACTURING COMPANY'S RESEARCH FILES.

MATERIAL	TENSILE STRENGTH
Armco Ingot Iron	47,000 psi.
AISI-C-1025	71,000 psi.
Stainless, Type No. 410	76,000 psi.
Stainless, Type No. 347	91,000 psi.
AISI-8630	115,000 psi.
Inconel-X	124,000 psi.
N-155	135,000 psi.



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Engineering News . . . AT A GLANCE

"DIGS IN" AT 320 MILES PER HOUR—Capable of making clean, square cuts across heavy sections, such as structural shapes, a new high-speed friction saw to be installed in various U. S. Steel warehouses, is reported to eliminate excessive burring. It revolves at a speed of 1750 revolutions per minute which makes the peripheral speed about 320 miles per hour. When the rotating blade contacts the material to be cut, friction generates heat faster than the material being cut can absorb it. Intense heat melts the surface of the material which is then carried away by teeth of the blade. Scraping and melting action continues throughout the cut.

HIGH-SPEED SHAKING—Sand from a 100-ton steel casting mold can be shaken out in less time than it takes a housewife to sift flour for biscuits with a new machine presently being built in the Passaic, N. J., plant of Hewitt-Robins Inc. According to the company, the unit, when completed early next year, will vibrate the mold 15 times per second. In a few minutes with the aid of two men, it can do a job normally requiring four to ten men using hand tools. Engineers state that the unit, termed one of the largest in the world, will shake the mold so hard that it also helps loosen sand which has fused and baked to the casting surface by the heat of the molten metal.

SIZE STILL CARRIES "WEIGHT"—Particle sizes exert a "considerable influence" on many of the properties of iron powders and their compacts, according to a report prepared for the Office of Technical Services, Washington, by Stevens Institute of Technology. It recommends that considerable attention be paid to the very close fractions (minus 100 plus 150 mesh sizes) as these appear to exert marked effects on the tensile strength of a powder. Report also points out that particle size is but one of the characteristics determining the properties of powders. The institute shortly will attempt to develop iron powder rotating bands for one of the Army arsenals.

CUTS MACHINING TIME—Savings of 25 to 50 per cent in machining time may be effected when using a new free-machining alloy steel being made available from warehouse stock, it was learned from Joseph T. Ryerson & Son, Chicago. The material, which is furnished in hot rolled and annealed condition or heat treated ready for use, is said to develop hardness comparable with that of AISI 4150-SAE 4150. It also is easy on cutting tools, life of the latter being extended some 50 per cent.

SECRET OF MACHINE CAPACITY—Production capacity of a machine very often depends on the methods used in processing materials to and from the unit—at least that was the experience of Flint Tool & Mfg. Co., Holly, Mich. The job of the machine, in this case a Progressive projection welder, was to projection weld a tapped plate inside an oil pan to hold the drain plug. With one operator, who handled parts to and from the machine, the unit produced 3000 welded assemblies in 8 hours. When it was found necessary to increase output, it was discovered that production capacity of the welder could be doubled each shift simply by adding a second "operator" to handle materials in and out of the machine, and by changing the method of transporting parts to the unit. Not a single piece of additional equipment was required for the boosted capacity.

SUBMERGED TESTING—In testing low temperature properties of 18-8 chromium - nickel steels, National Bureau of Standards, Washington, submerges the specimens in a refrigerant bath maintained at a selected temperature. Special apparatus devised for these tests allow the lower threaded end of each specimen to extend through the bottom of a cylindrical-shaped vessel containing the refrigerant, and into the lower adapter of the testing machine. (p. 82)

VITAL RUSTPROOFING AID—Prelude to rust proofing both ferrous and nonferrous metals involves proper cleaning of surfaces to be protected. Not only must contaminating and corrosive materials be removed, but care must be exercised to insure a dry surface—and one that is not again contaminated by handling. Keep in mind that selection of cleaning method always will be influenced by shape and design of part, materials used in its construction and cost. (p. 85)

PROVIDES QUICK ANSWERS—Once the analytical procedure of a fluorescence analysis unit is established, actual operation of the unit and interpretation of results can be performed competently by an average laboratory technician. According to M. A. Cordovi, supervisor, research department, Babcock & Wilcox Tube Co., an elemental analysis may be completed in 7 to 10 minutes with the present unit available, but there is good reason to believe that, with certain mechanical and operational modifications, this time may be cut down to about 5 minutes per element. (p. 88)

MORE TONNAGE POSSIBLE—Although it cannot be said at present that the modern electric arc furnace can compete with the open hearth furnace in producing common steels, there is a possibility this goal may be closely approached with the current progress in electrical equipment. Electric current has no effect on steelmaking except as a means of heat. Heat provided by electric current, it is pointed out, does not need an oxidizing atmosphere to support combustion as necessary in other fuels. This permits a control of chemical reactions not possible in other steelmaking processes. (p. 96)

Low Temperature Properties

Of 18-8 Chrome-Nickel Steels

Data compiled by the National Bureau of Standards is useful in predicting behavior of steels subjected to severe conditions encountered in high altitude flying, arctic regions and specialized refrigeration applications

FOR a number of years the National Bureau of Standards has been engaged in a general research program concerning the influence of temperature on the mechanical properties of metals and alloys. One phase of the program deals with the mechanical properties of austenitic 18:8 chromium-nickel steels at low temperatures ranging down to minus 188° C. Such information not only adds to fundamental knowledge of these materials but is also useful in predicting their behavior when subjected to the severe conditions encountered in high-altitude flying, arctic regions, and specialized refrigeration applications.

Steels of 18:8 chromium-nickel composition, both with and without additions of molybdenum, titanium, and columbium, were included in the bureau's investigation, which involved tests of the steels in annealed and cold-drawn conditions. When such steels are annealed, that is, cooled rapidly from about 1900° F, they are austenitic. If they are cold-worked, however, some of the austenite transforms to ferrite containing carbon in supersaturated solution. Although the metastable condition of these steels is undesirable for certain applications, their remarkable strength and toughness make them suitable for many types of service, especially when high resistance to corrosion and oxidation is required.

Mechanical properties of the steels were determined by tension tests with circumferentially notched and unnotched cylindrical specimens using a pendulum-hydraulic testing machine of 50,000 pound capacity. Tests at low temperatures were conducted with the specimens submerged in a refrigerant bath maintained at the selected temperature. In the special apparatus devised for these tests, the lower threaded end of a specimen extends through the bottom of a cylindrical-shaped vessel, containing the refrigerant, into the lower adapter of the testing machine. Lead washers are used to seal against loss of the bath liquid.

To obtain a temperature between room temperature and −78° C, a mixture of equal parts by volume of carbon tetrachloride and chloroform is cooled by pulverized solid carbon dioxide. Temperatures between −78° C and −188° C are obtained with liquid dichlorodifluoromethane (CCl_2F_2) (Freon 12), which is cooled by pouring liquid air into the end of an immersed copper coil while the refrigerant is being constantly stirred. A chromel-alumel thermocouple attached to the specimen permits accurate control at the desired temperature. For a temperature of −188° C, the specimen is fully submerged in a bath of liquid air.

In these investigations, the tensile load was applied more slowly than is usual in a tension test, to avoid local heating of the specimen during the plastic deformation. Duration of the test was generally about 1 hour. Simultaneous load and diameter measurements were obtained throughout the duration of the tests at room temperature, and the flow-stress curves were derived directly from these measurements. Since diameter measurements could not be obtained during the tests at low temperatures, automatic load-extension diagrams were obtained from the head

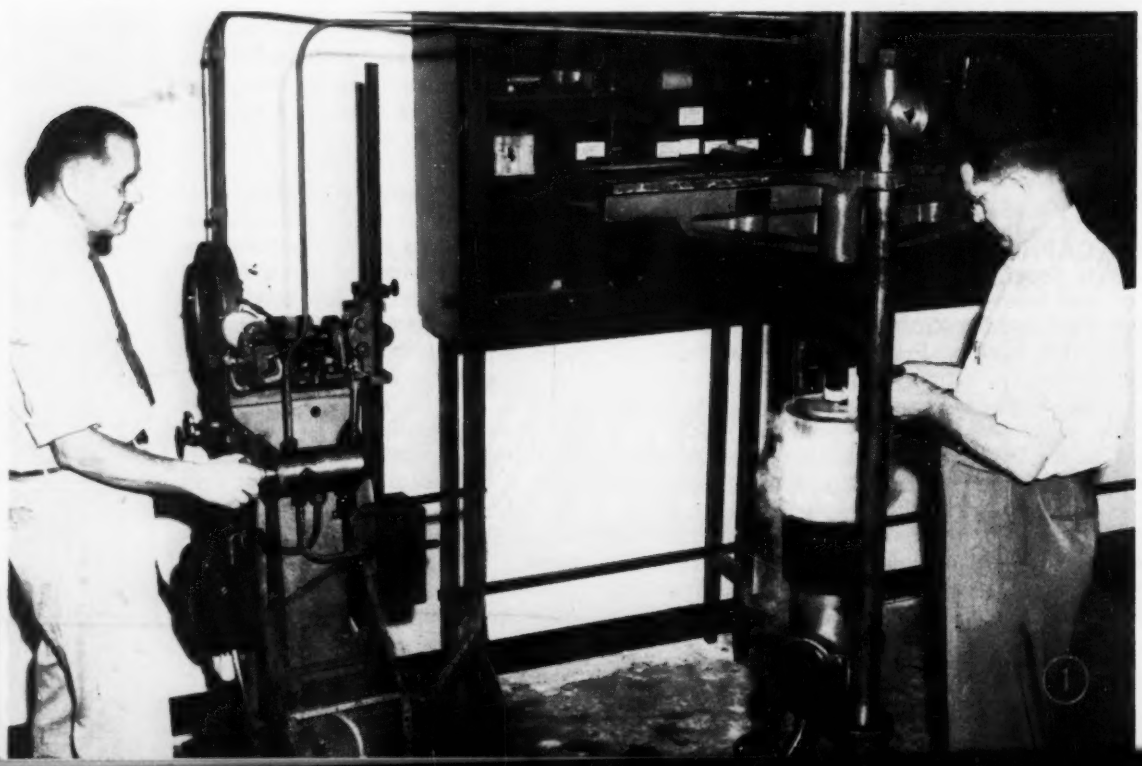

Fig. 1 — Over-all view of pendulum - hydraulic testing machine. Tension tests at low temperatures are conducted with the steel specimen submerged in a refrigerant bath (right) which may be maintained at temperatures as low as minus 188° C

movement of the tensile machine. Flow-stress curves were derived from these diagrams.

Plastic deformation of the metastable austenitic steels during the tension test causes some of the austenite to transform to ferrite containing carbon in supersuturated solution. Rapidity of this phase change, which hardens and strengthens the steel, increases as the temperature is lowered.

The automatic load-extension diagrams from the tension tests give clear evidence of phase change during the plastic deformation. The curves plotted from data taken in tests at room temperature are qualitatively similar to those obtained with a metal that does not undergo phase changes with plastic deformation. Slope of curve decreases continuously between points representing yield and maximum load.

Transformation from austenite to ferrite during plastic deformation in the tension test at room temperature is not sufficient to cause a qualitative change in the form of the curves. The load-extension diagrams at $-78°$ and $-188°$ C, however, give evidence of a rapid phase change at these low temperatures. Some curves plotted from test data at $-78°$ C were found to exhibit a reversal of curvature with a rapid increase in slope beyond the point of reversal, showing that the strengthening during plastic deformation is due not only to ordinary work-hardening, but also to hardening caused by phase change.

Other load-extension curves at $-78°$ C and curves at $-188°$ C clearly reveal still more evidence of the phase change. From the region representing the beginning of platic strain, the curves rise with continuously decreasing slope to a maximum. Descent beyond the maximum represents the effect of incipient local contraction. However, the local contraction and consequent descent is stopped by a rapid phase change. The influence of the strengthening due to this phase change then becomes dominant causing the curves to rise to a second maximum. This second maximum point represents the beginning of final local contraction, and the curves descend to the point representing fracture of the specimens.

These investigations show that six strength indices are sometimes (*Please turn to Page* 119)

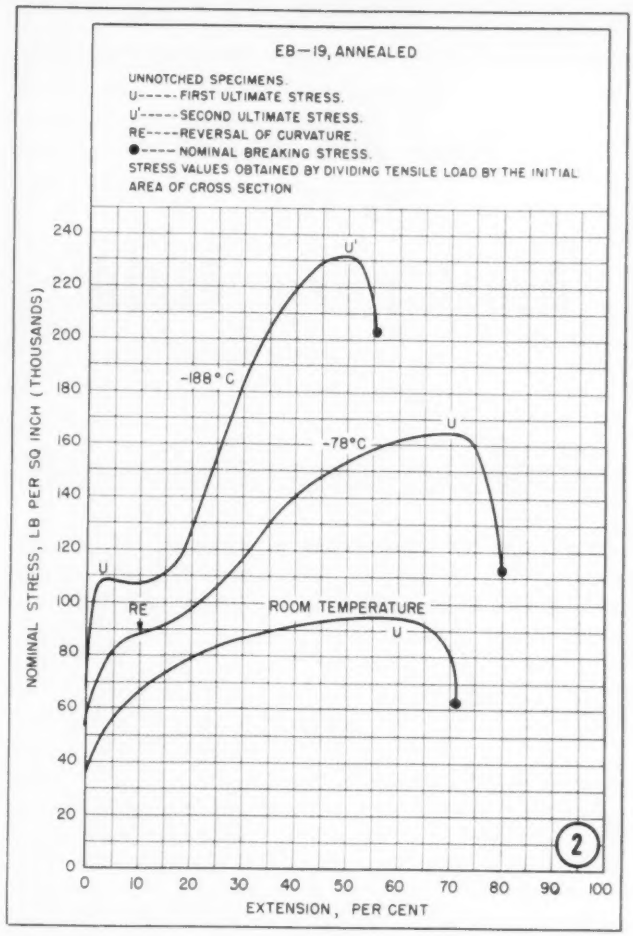

Fig. 2—Variations of nominal stress with extension of annealed 18:8 *chromium-nickel steel as obtained at the National Bureau of Standards. Stress-strain curve at room temperature is qualitatively similar to a normal stress-strain curve obtained without phase change. Curve at —78° C, however, gives evidence of a rapid phase change during the test by reversal of curvature (point RE) and the rapid increase in slope beyond this point. Strengthening of the steel by rapid phase change occurring during the extension at —188° C was so dominant that the stress-strain curve shows two maxima*

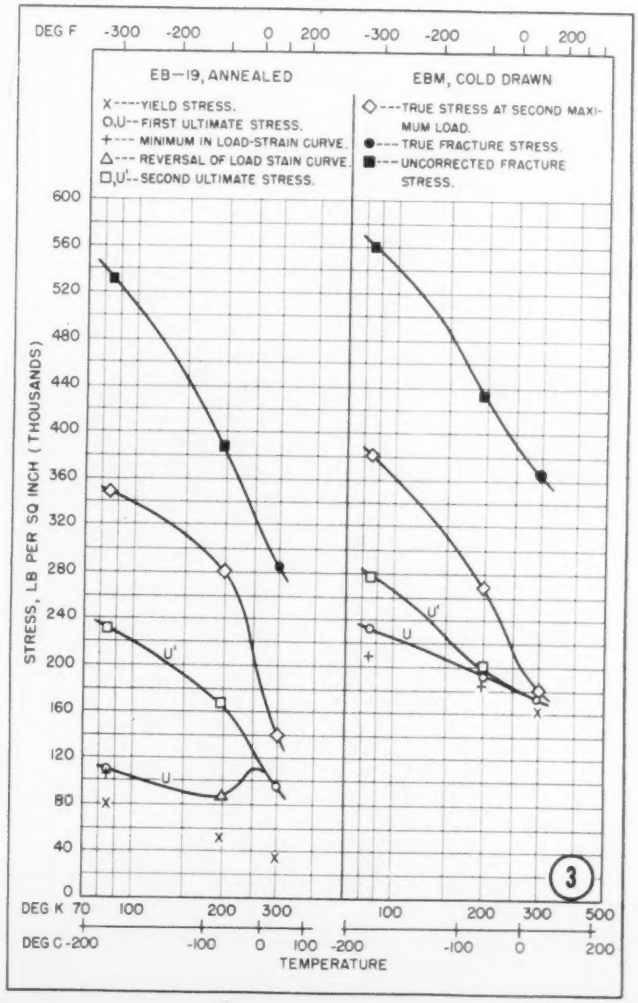

Fig. 3—Variation of the strength of plain 18:8 *chromium-nickel steel with temperature. Steel EB-19 had been annealed by quenching from* 1900° *F, while steel EBM was cold-drawn about* 49 *per cent reduction of area. Curves of the variation of the second ultimate stress with temperature (U') are affected by phase changes induced by plastic deformation. In the absence of rapid phase changes at low temperature there would be no second ultimate stress*

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

CENTURY OF WHITMAN & BARNES: I am indebted to M. J. Kearins, president of this famous tool company, for a copy of his brochure entitled "The First Hundred Years of Whitman & Barnes". As one who has made a study of industrial history, I have found in this book a number of things indicative of the trends of metalworking developments in America.

What today officially is designated as "Whitman & Barnes division of United Drill and Tool Corp.," came into being in 1848 as the "edged-tool" shop of Albert Page of Fitchburg, Mass. In 1854, Mr. Page joined forces with Augustus Whitman, big-time New England hardware dealer, as Page, Whitman & Co. Then in 1856, Mr. Page sold his interests to Eugene Miles, mayor of Fitchburg.

Resulting Whitman & Miles Mfg. Co. became "big business" as maker of knives for Cyrus McCormick's reapers—just then getting into mass production. In the meantime, an Englishmen by the name of George Barnes was becoming an active competitor in Syracuse, N. Y. To meet this competition the Fitchburg company bought the Farwell Scythe Works in Fitchburg. Then they built a knife plant in Akron, Ohio. Finally, in 1877, the competitors joined forces as Whitman & Barnes Mfg. Co.

Sensing the rising industrial tide in the midwest, Whitman & Barnes disposed of the Fitchburg plant and concentrated their activities—including manufacture of drop forgings, punches and cold chisels as well as reaper knives—in Akron and Canton, Ohio, Syracuse, and St. Catherines, Ontario. During the presidency of Col. A. L. Conger, one of Akron's most colorful industrial figures in the early 1880s, an exuberant newspaper man wrote thus of the company's activities: "New England has held the scepter of commercial supremacy — unmerited, uninherited — long enough. It is trembling in her palsied grasp. We are wrenching it from her—finger by finger!"

Whitman & Barnes got into the twist drill business in 1891 through purchase of Diamond Drill & Tool Co., of Akron. From that time forward, their knife business diminished and their drill business grew. To make a long story short, Whitman & Barnes gradually dropped its other activities and in 1926 merged with the Detroit Twist Drill Co., which had been established in 1891. And so it came about that after 57 years in Akron, Whitman & Barnes moved to Detroit. Now the company is starting its second century by buiding a "streamlined" 1,000,000 square foot plant at Plymouth, Mich., 19 miles west of Detroit. As Bishop Berkeley remarked many years ago, "Westward the tide of empire takes its way".

HOW CHIPS "GET THAT WAY": One of the most interesting machine shop practice sessions which I attended during the recent annual meeting of the American Society of Mechanical Engineers in New York, was that devoted to experimental methods of analysis in metalcutting.

I was particularly intrigued by the unusual mixture of theory and good solid common sense embodied in a paper by Michael Field, research engineer, and M. Eugene Merchant, senior research physicist, Cincinnati Milling Machine Co., presented by Dr. Merchant. This was entitled "Mechanics of Formation of the Discontinuous Chip"—in other words a chip typical of milling operations.

In years gone by a tremendous amount of misinformation about metalcutting has resulted because theories as to what goes on at the tool's edge were "dreamed up" by people who either did not take the trouble to experiment or saw things that weren't.

Messrs. Field and Merchant don't get the cart before the horse. They experiment first and theorize afterward—thus basing their theoretical work (and mighty deep work it is) on actual facts.

To sum it all up in a few words, they took timed motion pictures—through a microscope—of a typical "tooth" plowing through a small bronze work piece. Each chip segment was covered by from 25 to 50 frames of film. The result, as thrown on the screen, appears much like a slow snow plow pushing into sticky "sugar snow"—as we used to call it in Vermont in early spring. A lump builds up in front of the "plow", then shears off the work and tumbles out of the way. That is a "discontinuous chip".

Taking these "timed shots" as a basis, Messrs. Field and Merchant have drawn diagrams and have analyzed these diagrams mathematically, thus getting at the fundamental geometry and mathematics of this particular variety of metalcutting. Those results in turn can be translated into better cutting tools.

As far as I am concerned the geometry and the mechanics just mentioned are considerably "over my head", but after seeing those Field-Merchant movies I certainly do have much better understanding than before as to "how chips get that way".

LOCALIZED HEAT: Oldtime machine shops were uncomfortable places largely because too many things were in the wrong places. Among those things were noise, dust and heat—especially heat.

Like the ancient Chinese who burned the barn to roast a pig, the oldtime "blacksmiths" spread smoke, fumes, noise, dust and heat all over the shop in their valiant efforts to forge and heat treat work with the antique facilities of their ancient trade.

Within a few short years localized, controlled heating by oil, by gas and by electrical means—including electrical induction—at long last has won for "blacksmithing" that respectability which King Solomon recognized as deserved by men of that profession.

Long considered an incidental process, rust-proofing metal parts prior to shipment is now included as a vital production step. Cleaning procedures reviewed here include removal of such films as mineral and saponifiable oil, insoluble particles, smut, hard water and unrinsed cleaner salts, and oxides. Grease, solvent, oil and plastic type corrosion-preventives also are discussed

How to Corrosion-Proof METAL PARTS

By ROBERT G. CLENDENIN
Nox-Rust Chemical Corp.
Chicago

WHILE packaging serves chiefly as a means of facilitating the movement and handling of commodities, protecting them from mechanical damage, dirt and pilferage, it serves only to a limited extent to protect those products susceptible to corrosion. This refers in particular to metals, both ferrous and nonferrous, which are not, like stainless steel, formulated to offer resistance to corrosion.

Package alone cannot be relied upon to give adequate assurance that metal will retain its usability and factory-new appearance. Some means, therefore, must be utilized to perform one of the following functions:

(1) Remove moisture from air within the package such as with silica gel, (2) neutralize the corrosive tendency of air by using newly-developed chemically treated papers which produce a vaporous protective blanket, or (3) shield the metal itself from moisture by a protective coating. The last named method is the most widely used today. Protective coating for metal may be either in the form of a paint or ceramic,

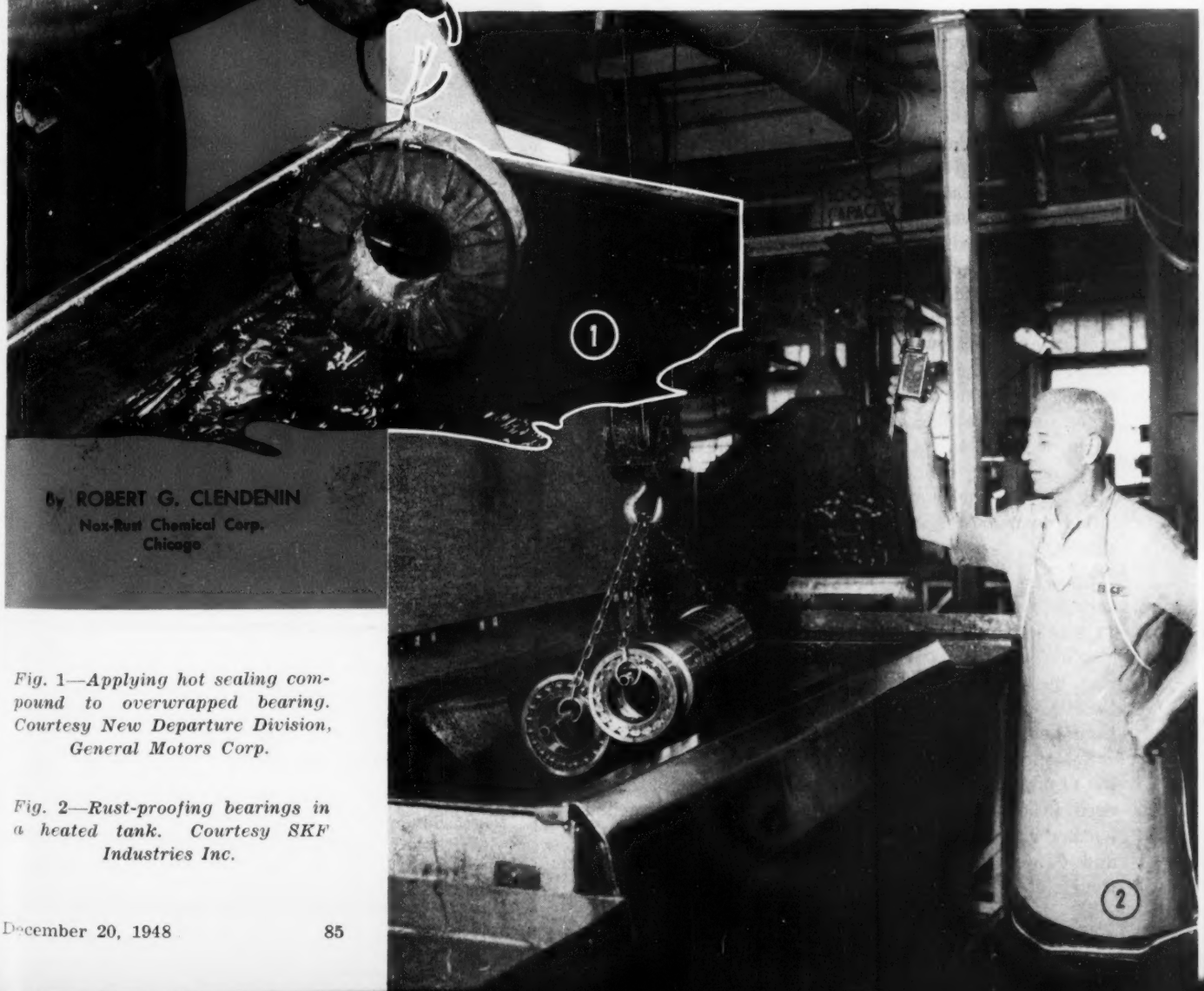

Fig. 1—Applying hot sealing compound to overwrapped bearing. Courtesy New Departure Division, General Motors Corp.

Fig. 2—Rust-proofing bearings in a heated tank. Courtesy SKF Industries Inc.

a chemically bonded coating such as a phosphate or a petroleum base compound which may be removed when the desired period of protection has elapsed. This article deals only with the latter method.

Scientific rust prevention is a comparatively new and specialized field. The advent of mechanized global warfare, presenting corrosion problems hitherto unknown, has given impetus to its development and its acceptance by industry. Lessons learned during these periods have made a major impression, one not likely to be forgotten during peaceful years, even though the conditions encountered during shipping are considerably less severe.

Axle Grease—The time is not too far behind us when lard oil and turpentine, axle grease, lubricating oil and even crankcase drainings were considered satisfactory preventives. Steaming heat of the tropics and devastating ocean salt air quickly proved otherwise. Whereupon rust preventive manufacturers and the armed services pooled their "know-how" and manufacturing skill to establish rigid standards for preventives which would deliver the goods. Metal working plants and their customers are now realizing benefits from this accelerated development.

There are a few plants, however, who consider rustproofing simply as an incidental process. They deplore the small amount of time actually required for rustproofing, and do not hesitate to insist upon tailormade specifications with definite handling properties, not fully realizing that rust preventives, like 3-minute eggs, have certain physical properties which cannot be easily altered and still provide the protection which is desired. It is not uncommon to receive requests for cold dip noninflammable coatings which will dry in 5 minutes to a hard lacquer finish, which will provide years of protection and which will wash off in lukewarm water. Frequently customers become so concerned over handling properties that they lose sight of the primary objective to get the product there in usable condition.

Rust prevention must be considered a definite process equally as important as the final machining operation of a part which naturally takes time to perform. True, the previously mentioned characteristics are desirable, but until developed by research it may be in some cases necessary to alter the manufacturing process or to install one or more tanks or cleaning processes in order to achieve proper rust proofing. Any part or tool corroded beyond usability has absolutely no value regardless of how carefully it was machined.

Cleaning Methods — Prelude to rustproofing involves proper cleaning of the surface to be protected. This is most important and should not be overlooked. Not only must contaminating and corrosive materials be removed, but care must be exercised in seeing that the surface is dry and that it is not again contaminated by handling.

Selection of the cleaning method will be influenced by (1) shape and design of the part, (2) materials used in construction of the part, such as attached leather and rubber, (3) type of residue on the parts, and (4) cost, advantages and disadvantages of particular cleaners.

Generally speaking, there are five common detergents and solvents in use today for cleaning. These include petroleum base solvents such as VM&P naphtha, Stoddard solvent, oleum spirits and kerosene; coal tar solvents such as toluol, benzene and high-flash naphtha; chlorinated solvents such as trichloroethylene; hot alkali solutions; and hot alkali solutions containing soap. Coal tar solvents offer somewhat greater solvency than do those of petroleum origin. They are, however, somewhat more toxic to handle. Perhaps the most effective method is use of chlorinated solvents in a vapor degreasing process where the solvent remains free of impurities. Advantage of alkali cleaners lies in their low cost and noninflammability. Any of the types mentioned are effective in 90 per cent of the cleaning problems.

In the selection of cleaners, we are confronted with the removal of various contaminating sub-

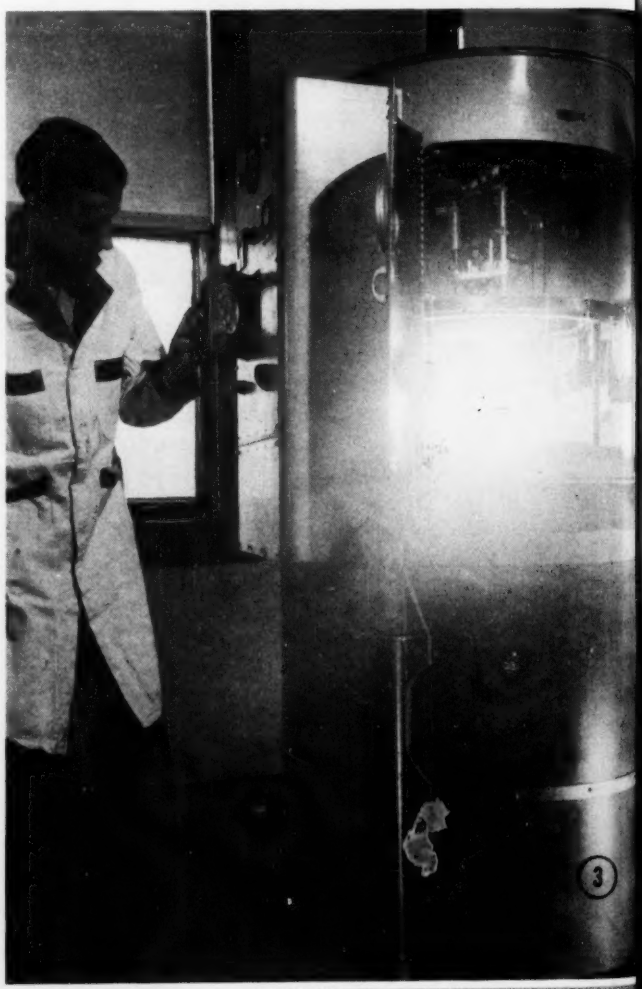

Fig. 3—Accelerated tests for certain rust preventive coatings involve exposure for 5 hours to ultraviolet light, followed by 19 hours in 100 per cent relative humidity at 100° F. Number of cycles coatings withstand determines quality of the product

Fig. 4—Treating beams for outdoor storage protection. Sunken tank permits easy accessibility to a lift truck. Courtesy International Harvester

stances found present on metal articles. These substances are chiefly oils and greases derived from slushing and stamping oils, antirust materials and oils used during machining and threading operations. These oily substances may be divided into two classes: (1) Animal and vegetable oils and fats; (2) mineral oils and mineral fats and greases.

The first class can be removed by saponifying and emulsifying in strong alkaline materials, whereas the latter are removed by saponifying and emulsifying in alkaline solutions containing soaps or other wetting and detergent agents. Concentration of solutions depends largely upon the amount of contaminant to be removed and the method of using. Temperature will usually range from about 170 to 200° F.

Films to be Removed—When checking for incomplete cleaning, it is easier to think in terms of films. The following recommendations are submitted on the basis of identifying the type of film causing the difficulty:

If incomplete removal of mineral oil or grease is the cause of the trouble, the film can be detected by dipping the work in a cold water rinse after cleaning in an alkaline solution and noting the water break. If this same work is then dipped in a solvent, such as gasoline, Varsol, carbon tetrachloride or kerosene, and is put back through the cleaning process and comes out of the water rinse without a water break, the chances are the mineral oil film was not wholly removed. The remedy may then lie in precleaning, increased strength of alkaline material, using a material with some soap or resin content, or increased temperature or time.

Should the incomplete removal of animal oil, fat or grease be the cause of difficulty, you will get the same effect of a water break after the rinse. Take the work and rub a section of it while it is wet with a strong solution of the alkali cleaner. This is applying a highly concentrated solution in one spot with a rag. Put the work back into the cold rinse water, and if that particular section shows no water break after rinsing, it will indicate that the difficulty may be solved by changing to a material with higher alkalinity, or increasing the time in cleaner.

Work coming out of a process with specks on it may mean the incomplete removal of insoluble particles, such as clay, sand, carbon, etc. Such particles should rub off on the finger with light pressure and should feel gritty. They are generally visible; the problem is to distinguish this type of particle from smut which is mentioned in the next paragraph. For complete removal of this type of soil, it is generally necessary to provide increased agitation of the solution or to look for possibility of sprays not properly hitting the work in machine washing operations. At times the change to a material with a soap content so as to improve the slip quality between the particle and the surface may be advisable.

Difficulties due to smuts, which are mostly metallic carbides, are generally visible. The work will show no water break when it comes from the rinse but if a rag or the finger is passed lightly across the surface a clean mark is visible where the smut has been removed, and often the smut itself may be seen on the white rag. Smut difficulties do not always have to be eliminated. If they do, however, precleaning should help.

In many cases it may appear that the cleaning material is not doing a job because a film is left on the work after it is dry. When this difficulty is encountered, it is advisable to determine whether the film left on the work comes from the hard water salts of the rinse water or from a combination of the hard water salts and the cleaning material. This film is always visible and generally light in color. It is quickly dissolved by (*Please turn to Page* 116)

Rapid Quantitative Analysis by X-RAY FLUORESCENCE

Results of experimental work undertaken to evaluate the industrial merits of an x-ray fluorescence analyzer indicate that a few modifications in present design will bring accuracy within limits required in routine quantitative chemical analysis of metals

By MARCEL A. CORDOVI
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Acknowledgement

The author wishes to acknowledge the helpful assistance of his associates, Messrs. G. Shield and T. Polhemus. Thanks are due to Babcock & Wilcox Tube Co. for permission to publish the data presented here.

IN THE latter part of 1947, North American Philips Co. Inc., Mt. Vernon, N. Y., announced the commercial production of the Norelco fluorescence analyzer. This unit was developed for rapid quantitative analysis of elemental constituents in metals, minerals and ores.

Some of the outstanding features claimed by the manufacturer for this equipment included the following:

1. The analyzer is arranged to function for elements from titanium (atomic #22) through tin (atomic #50).*

2. Determinations may be made on an absolute or comparative basis on percentages up to 100 per cent, with a reproducibility to better than 5 per cent.

3. Equipment does not require exceptional stabilization of line potential.

4. Determinations are independent of phase or structure.

5. Average determinations over large area of specimen avoid possibility of errors due to segregation; specimen not destroyed or otherwise affected in course of analysis.

6. Analysis is speedy and unit does not require specialized technical training for operation.

On the basis of these claims, the fluorescence analysis unit embodies such characteristics as to make this method of analysis comparable to or better than wet chemical or optical spectrum methods. It is these considerations that prompted Babcock and Wilcox Tube Co. to purchase, on co-operative research basis, the first such unit marketed commercially.

Experimental work presented in this article was undertaken to evaluate, from an industrial viewpoint, the merits of the fluorescence analyzer for routine quantitative chemical analyses. In this initial phase of the proposed research emphasis was placed on determining optimum operational procedures and establishing the individual or combined effects of certain pertinent variables involved. In view of the limited experience with the unit, data presented here should be considered only as preliminary.

Fundamentals—Theoretical background of fluores-

* The following elements comprise that range: Ti (atomic No. 22), V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Kr, Rb, Sr, Y, Zr, Cb, Mo, Ma, Ru, Rh, Pd, Ag, Cd, In and Sn (atomic No. 50)

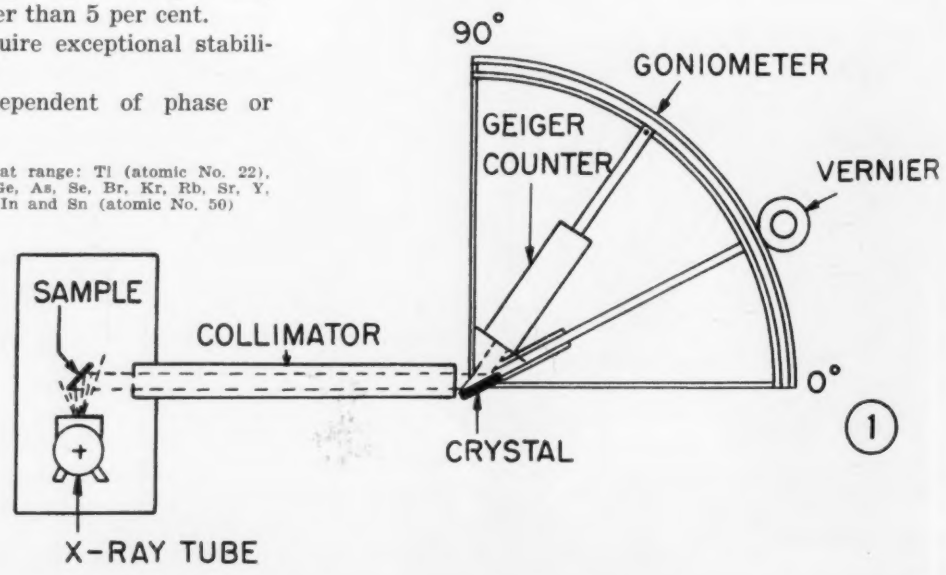


Fig. 1—Principal components of fluorescence analyzer

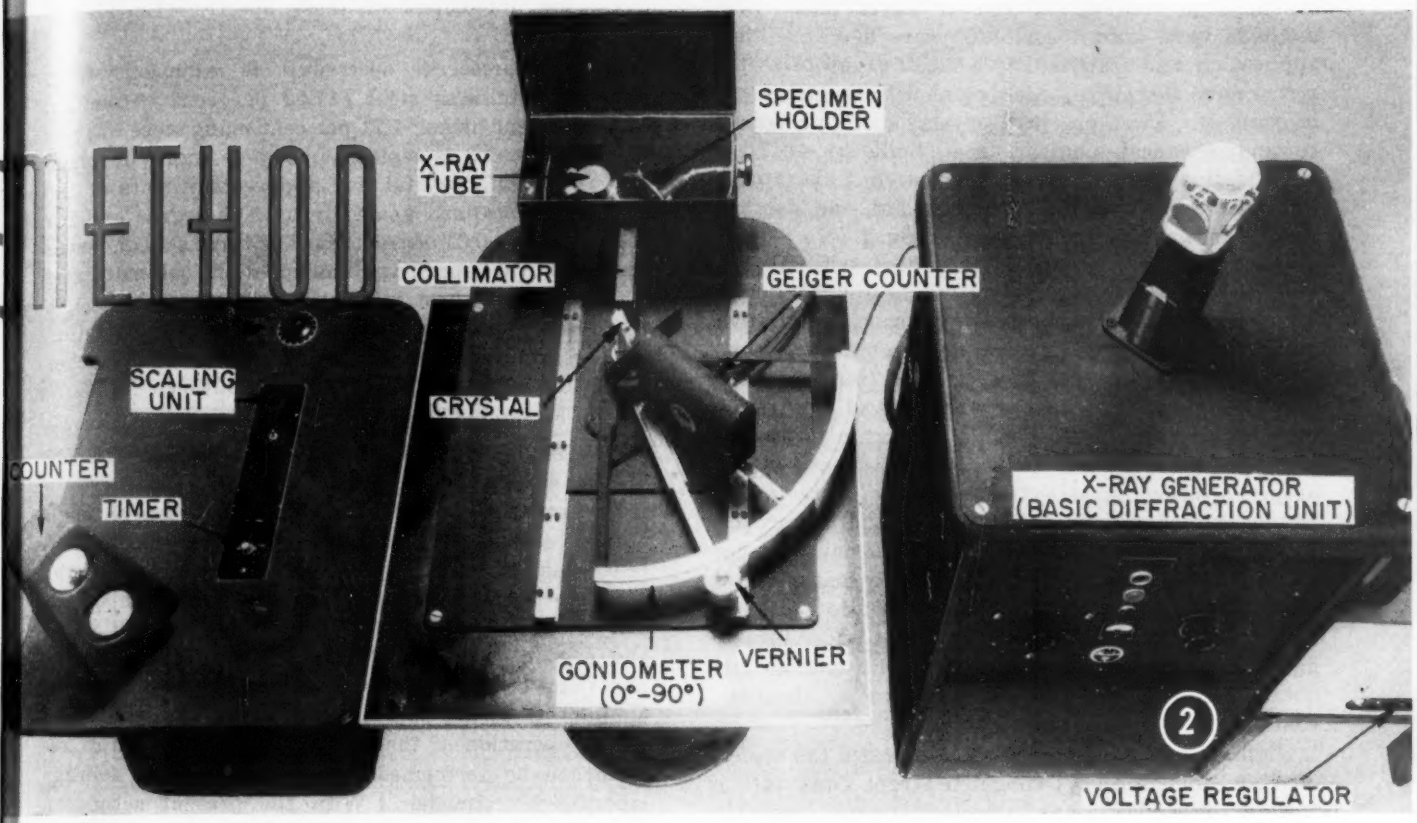


Fig. 2—General view of fluorescence analysis unit

cence analysis stems from the elementary concepts associated with radiation spectra. When a material is bombarded by cathode rays, the resulting x-ray emission consists of a general or continuous ("white") spectrum and a superposed characteristic ray spectrum extending over a range of wavelengths from about 10^{-6} to 10^{-9} centimeters. The continuous spectrum is independent of the target material and its general features preclude the possibility of directly associating it with its emission source. The monochromatic rays of the characteristic x-radiation, however, are grouped in simple series, with wavelengths depending upon the atomic number of the emitting element.

Emission of characteristic x-rays is due to the inner electrons of the atom. According to Bohr's theory, these electrons are supposed to occupy shells, designated as K, L, M, etc., around a central nucleus and to whirl around it in the same way that the planets revolve about the sun. Thus, when an impinging electron collides with an atom of the target and ejects one of its electrons, say from the innermost (K) orbit, the vacancy is filled instantly by an electron from the outer shells (L, M, etc.). As a result, a line of the K series will be emitted, its energy value depending on the source of the replacement electron.

Wave lengths of the spectral lines comprising the K, L, M etc. series are inversely proportional to the square of the atomic number. In other words, the higher the atomic number of the target material, the shorter the wavelength of radiation and the greater its penetrative power. The K emission lines represent the shortest wave length group and are the most important of the various series in view of their comparative simplicity and high intensity. The K series of all elements, except the lightest, consists of four principal lines, of which the α_1 α_2 doublet is the most intense and closely spaced. By comparison, the L series spectrum is more complex in view of the numerous lines (about thirty have been identified) of much lesser intensity than the K series.

Chemical analysis by x-rays is made possible by the specific and distinguishing features of characteristic rays for each element in the target and by the direct, though not necessarily linear, relationship existing between the percentage of these elements and the intensities of their emission lines. These conditions will be satisfied also if a sample is irradiated outside the x-ray tube, provided the primary radiation is of sufficiently short wave length and the x-ray quanta have energies nearly approaching those of the electrons in the cathode beam. The fluorescence spectra, i.e. the line radiation resulting from the excitation of an atom by the absorption of x-rays, can be then conveniently identified with a crystal spectrometer.[1] Secondary fluorescence spectra are of much lower intensity as compared to direct excitation. This is so because when a sample is irradiated outside the x-ray tube, the intensity of exciting radiation per unit area falls off with the inverse square of the distance from the focal spot. This drawback, however, is largely overshadowed by several important advantages pertaining to the secondary fluorescence spectrum which make it the most practical source of radiation for chemical identification purposes.

Analytical Procedure — Use of x-rays for spec-

trochemical analysis is not a novel idea. Such methods were known some 20 years ago[2] but their application was restricted to a small group of skilled researchers thoroughly conversant with spectrographic analysis. First practical crystal spectrometer for routine chemical analysis was built in 1947 by H. Friedman, U. S. Naval Research Laboratory.[3] This unit became the prototype of the Norelco fluorescence analysis unit shown in Fig. 2.

Operation of this unit is illustrated schematically in Fig. 1, and involves essentially the following: An unknown sample is subjected to intense, short-wavelength primary radiation from a tungsten x-ray tube. The secondary fluorescence spectra of the sample are passed through a collimator and allowed to strike a crystal analyzer. The latter acting as a diffraction grating, separates the component radiations and, by proper positioning, reflects them at a characteristic Bragg angle. Individual quanta of radiation are detected by a Geiger counter, which transmits the impulses received to an electronic scaling and counting unit. Counts are totalized over a definite period of time and the percentage of the element under investigation is obtained by proportioning with similar data obtained from a standard sample of known elemental content.

High voltage generator used to energize the sealed-off (beryllium window) tungsten target x-ray tube is that of the conventional Norelco diffraction unit. The specimen is irradiated outside the x-ray tube (50 KvP; 20 M.A.) and is positioned at 45 degrees to the axis of the cone of incident x-rays. The sample is similarly positioned with respect to the collimator, which consists of a honeycomb of thin-walled nickel tubing (1/16 or 1/32-inch diameter; 0.002-inch wall; 4-inch, 8-inch or 16-inch long) packed into an aluminum frame of rectangular cross-section. The collimator serves to transmit a nearly parallel beam of fluorescence radiation to the crystal analyzer, which is usually rock salt or calcium fluorite.

The NaCl crystal is satisfactory for the K series of elements ranging from about titanium ($K\alpha_1$ = 2.74681 A. U.)[4] to zirconium ($K\alpha_1$ = 0.78851 A. U.).[4] The spectra of elements above atomic number 30 decrease in intensity in proportion to the sine of the Bragg angle. To compensate for the diminishing dispersion in the spectra of such elements, it is necessary to use crystal planes with smaller grating constant. This requirement is partially met by fluorite, whose atomic plane spacing, (220) plane, is 1.93 A.U. as compared to 2.814 A.U. for rock salt, (100) plane.

With the present arrangement of the fluorescence analysis unit, it is possible to analyze that group of elements whose atomic number falls between about 22 and 50. The limited peak voltage (50 kilovolts) in the primary x-ray spectrum is insufficient to excite efficiently the K spectra of elements with higher atomic number. On the other hand, the wave lengths of the lighter elements suffer from serious air absorption with attendant great reduction of their K series intensities.

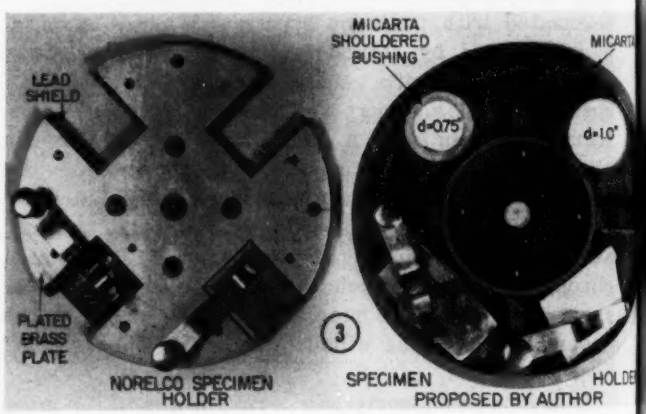
The elements above atomic number 50 may be analyzed by their L series lines, using extended counting intervals to compensate for the comparatively low intensities of these spectra ($L\alpha_1 : K\alpha$ = 1 : 10).

X-ray fluorescence spectrum (K radiation) from Type 347 stainless steel (17.50 per cent chromium, 11.94 per cent nickel, 1.71 per cent manganese, .73 per cent columbium) is depicted in Fig. 4. Angles of reflection from NaCl crystal, for alloy constituents of the steel, were scanned generally at 0.05-degree and for the peaks—at 0.01 degree(2θ). The three sets of curves represent the spectra obtained with collimators 4 inches long (highest intensity, poorest resolution), 8 inches long (good intensity and satisfactory resolution for the group of elements investigated) and 16 inches long (lowest intensity and best resolution).

The calculated Bragg angle settings for the K-radiation of several steel alloying elements are given in the accompanying table.

Performance—In common with all types of engineering activity, the industrial merits of the fluorescence analysis unit may be evaluated in terms of the economy and technological aspects which it offers. The unit involves a capital investment of about $7000 and a maintenance cost (replacement of expendable parts and servicing) in the order of $800 to $900 per annum. Once the analytical procedure is established, actual operation of the unit and interpretation of results can be performed competently by the average laboratory technician. With the present setup, an elemental analysis may be completed in 8 to 10 minutes; we have good reasons to believe, however, that, with certain mechanical and operational modifications, this time may be cut down to about 5 minutes per element. It is quite apparent then, that the x-ray fluorescence method offers one or more definite advantages in economy over existing alternative methods of routine quantitative chemical analysis.

Fig. 3—Specimen holder arrangements. (left) Section of Norelco specimen holder, (right) section of proposed new holder



Principal technological requirement, as regards the analysis of steel, stipulates an accuracy and reproducibility of results to better than plus or minus 1 per cent. It is essential, therefore, to discuss briefly some of the pertinent factors which appear to attenuate the potential accuracy of the analyzer.

Aforementioned effects of air absorption and the

BRAGG ANGLE SETTINGS FOR ROCK SALT CRYSTAL

Element	Atomic Number	Bragg Angle, degrees* K_α	K_β
Ti	22	29.19	26.48
V	23	26.37	23.90
Cr	24	23.96	21.70
Mn	25	21.90	18.80
Fe	26	20.08	18.15
Co	27	18.51	16.70
Ni	28	17.11	15.43
Cu	29	15.89	14.29
Zn	30	14.78	13.27
Zr	40	8.03	7.15
Cb	41	7.62	6.78
Mo	42	7.24	6.44

* X-ray fluorescence K spectrum

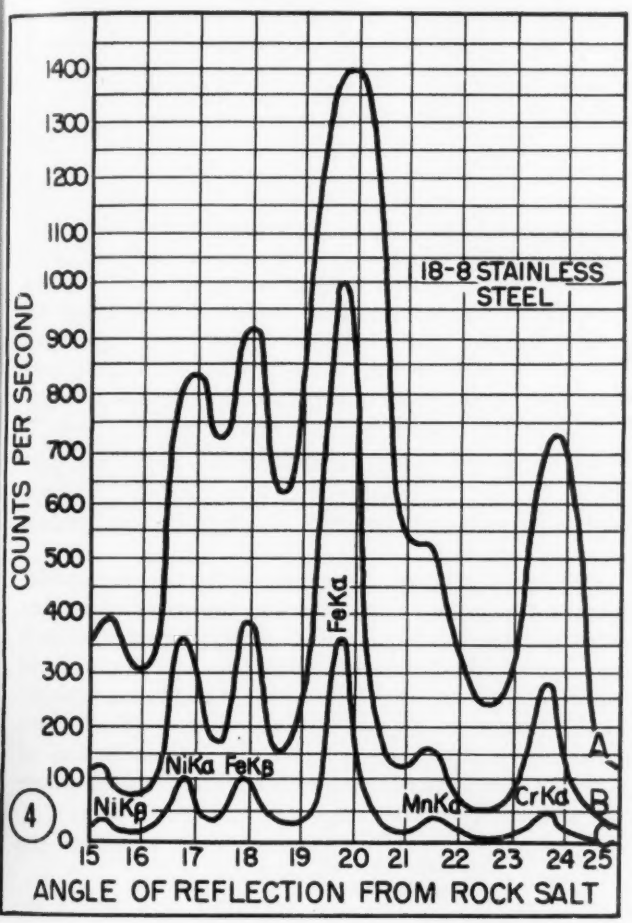


Fig. 4—X-ray fluorescent spectrum from stainless steel (17.50% Cr, 11.94% Ni, 1.71% Mn, 0.73% Cb) (A) Four-inch collimator, (B) 8-inch collimator, (C) 16-inch collimator

properties of various crystal analyzers are adequately covered in the literature and need not be further discussed here[5]. This is also the case with methods of treating data obtained by Geiger tube counting. Number of variables which need further elucidation is then reduced to the following:

Fluctuations in the line potential are a common occurrence in practically all industrial concerns. This condition becomes quite serious in the industrial application of the Norelco unit, in view of the direct relationship which exists between intensity of fluorescence and voltage across the x-ray tube. Preliminary experiments indicated that a considerable drift in intensity, with attendent error exceeding plus or minus 6 per cent in the ultimate analysis will result unless current and voltage are adjusted manually throughout the entire counting period.

These circumstances immediately suggested the absolute necessity of voltage stabilization. Accordingly, a Sorensen voltage regulator was acquired, which feeds the x-ray generator at 230 volts root mean square and provides a plus or minus 0.2 per cent regulation over a load range of 10-100 per cent at a frequency of 60 cycles (model 3000-2-A). This instrument was quite effective in reducing the drift in intensity and in narrowing the limit of ultimate analytical error to about plus or minus 2.5 per cent of the actual content of the element present. Converted into more practical terms, such an error will set the composition of a 17.50 per cent chromium steel at some value between approximately 17.05 per cent and 17.95 per cent chromium. Obviously, such a range is considerably broader than the limits of permissible variation in the analysis of steel. It is believed that further improvement in this direction may be accomplished by means of a synchronous motor-generator set.

Our experimental work has produced evidence indicating that matrix absorption or excitation effects may seriously disturb the proportionality between concentration of an element and the intensity of its characteristic emission lines. These effects are associated with the average atomic density of the component elements in the matrix and are illustrated by the results in Fig. 5. The plotted data were obtained on the following types of alloys: (a) 0.5 to 8.89 per cent chromium (chromium-molybdenum steels); (b) 12.00 to 27.22 per cent chromium (high chromium-irons); (c) 13.66 to 15.00 per cent chromium (Inconels); (d) 17.50 to 25.14 per cent chromium (austenitic stainless steels). The results indicate that the relationship between intensity and percentage chromium is generally nonlinear for the steels in group (a). By comparison, the alloys in groups (b), (c) and (d) exhibit good linearity for the composition ranges investigated (in all cases, chromium was in excess of 12.0 per cent). It will be noted, however, that the Inconels (high nickel) and the chromium-nickel (austenitic) stainless steels form a separate graph and exhibit lower intensity, for comparable amounts of chromium, than the straight chromium steels of group (b). Thus, in our experiments we obtained 200 counts per second for a 12.90 per cent chromium-iron and the same number of counts for an Inconel containing 15.00 per cent chromium. In other words, if the Inconel sample containing 15.0 per cent were used as a comparison standard in the analysis of a 12.90 per cent chromium-iron, the composition of the latter will be determined as 15.0 per cent chromium, hence will involve a 14 per cent error in the ultimate analysis. This condition, however, does not detract from the usefulness of the fluorescence analysis unit because of the following considerations.

In the majority of industrial applications, the approximate chemical composition of the sample being analyzed is known; in such cases it is only necessary to use a standard of similar composition in order

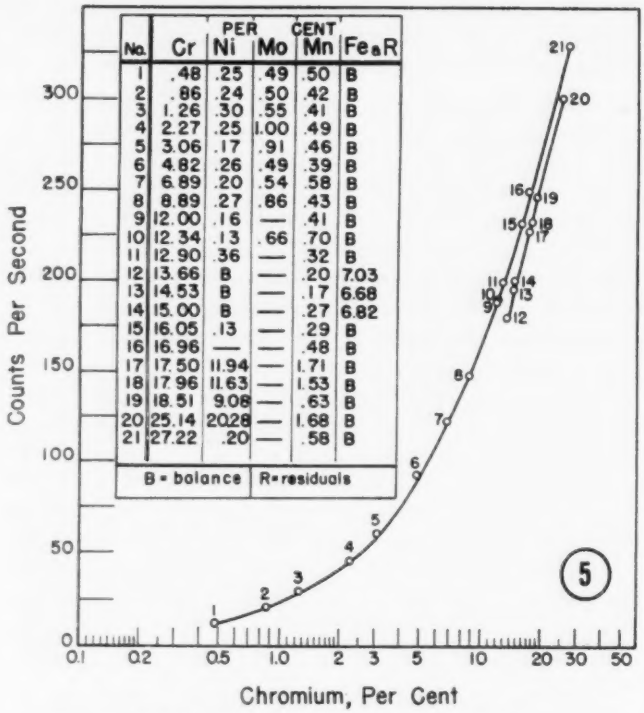


Fig. 5—Relationship between intensity of characteristic x-radiation and chromium content for various types of alloys

to determine the elemental analysis of the sample. In the event that the sample is of unknown composition, it will be necessary to first run a rapid qualitative analysis with the fluorescent analyzer, then select a suitable standard and follow the regular procedure to determine the actual percentages of the elements present in the sample.

Total amount of fluorescence is a direct function of the area of the secondary radiator which is exposed to the incident cone of x-rays. The intensity of radiation is also influenced by the geometrical arrangement of the sample and the x-ray tube. On the basis of these considerations, the specimen holder in the Norelco analyzer is not only impractical but also is conducive to analytical errors. This holder is of the indexing type and accommodates four samples measuring 1-3/16 x 31/32-inch. Its impracticability stems from the tedious, hence costly, machining of specimens to the specified dimensions in order to avoid variations in the amount of area exposed. Furthermore, the lead shield, Fig. 3, which serves as a stop for the specimen, may be easily deformed by the pressure exerted upon it while inserting thick specimens in the holder.

Resulting variation in the set position of the samples with respect to the x-ray tube, will produce changes in intensity which may become critical—especially in the case of elements which are present in residual amounts. To overcome these difficulties, we have designed and constructed the micarta model depicted in Fig. 3. The new holder permits the insertion of roughly cut samples measuring up to 1¾-inch in length and up to 1⅛-inch wide. The circular openings in the holder were carefully machined to 1 inch diameter and may be adjusted precisely to any desired size or shape by means of shouldered bushings. In addition to these advantages the new specimen holder is also much more rigid and cannot be distorted locally inasmuch as it was made of a single piece of micarta.

Several types of surface preparations were investigated to establish and standardize on the most satisfactory specimen preparation. Sixteen specimens of identical chemistry were separated into four groups and tested in the following condition: (a) Roughly ground; (b) sand blasted; (c) ground flat, then finished on Nos. 2 and 1/0 emery paper; (d) complete metallographic polish. Preparations (a) and (b) were found to produce generally inconsistent results and the measured intensities were 3 to 5 per cent lower than those with the other two surface finishes.

Metallographic polish and emery finish yielded comparable results which were satisfactory in both cases. Therefore, for reasons of reproducibility and economy we adopted the emery finish as our standard method of specimen preparation. The observed difference in intensity between polished and sand blasted surfaces, is due to the greater absorption of emitted fluorescence radiation by the rougher sand blasted surface. Tests indicate that similar differences in intensity exist also between solid and powdered samples because of the same reasons stated above. Due consideration of these factors, therefore, is essential in the proper selection of standards.

Variations in grain size (ASTM 1-6), and the effect of cold work were also investigated. The analytical determinations were found to be independent of these factors.

Currently we are concerned with the determination of bracketing standards for the more important constituents of alloy steels. It is estimated that a set of 100 standards will cover the useful ranges of chromium, nickel, molybdenum, manganese, columbium, titanium, copper and vanadium. Other work presently in progress involves the determination of optimum excitation voltage for various steel alloying elements.

Conclusions—Our experimental work warrants the following tentative conclusions:

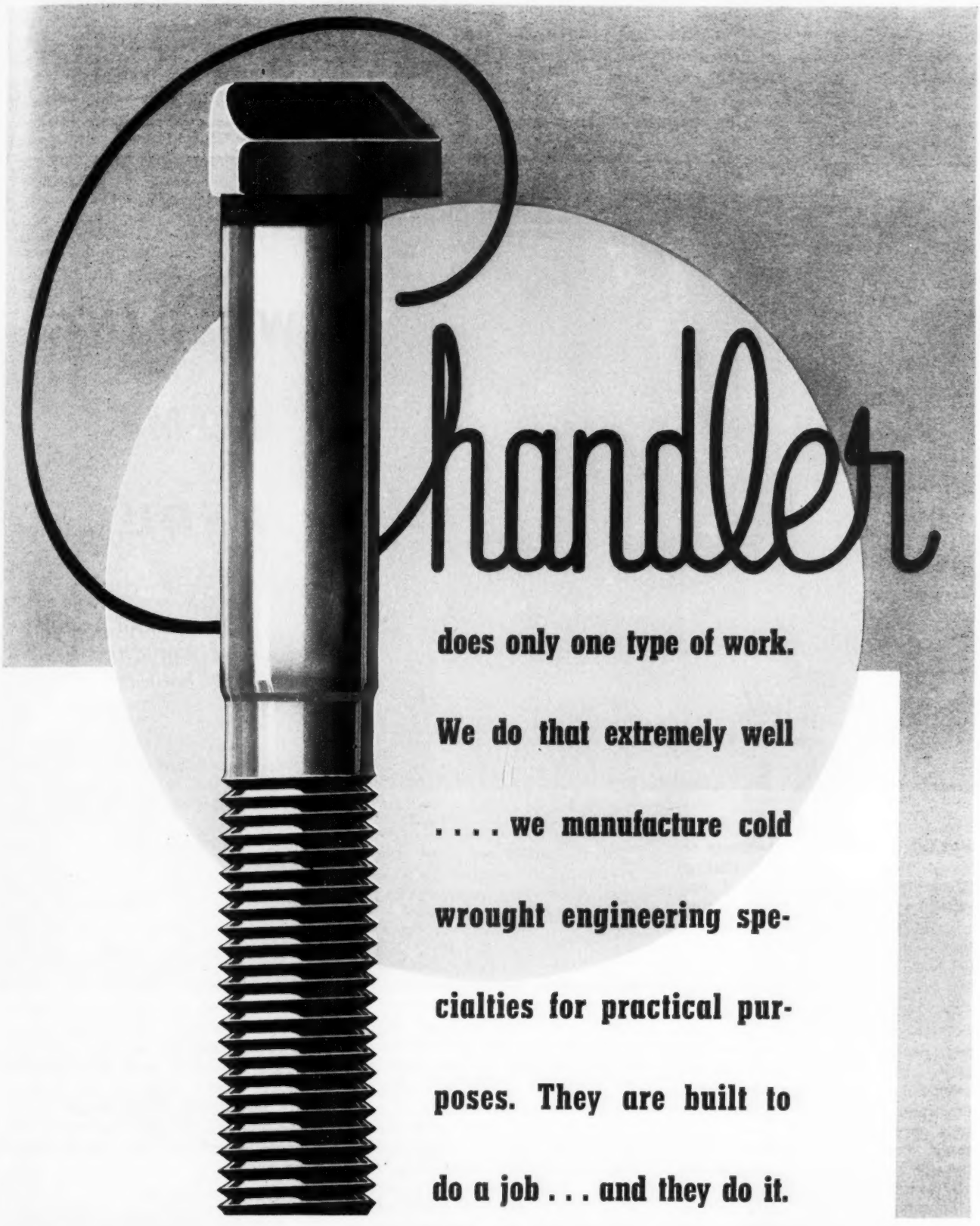
Stabilization of the line potential is a prime requisite for successful industrial application of the fluorescence analysis unit.

Comparison standards must be closely representative of the sample being analyzed both chemically and in the mode of preparation. The range to be covered by bracketing standards will have to be determined individually for each element and for each type of alloy.

The relationship between intensity of fluorescence radiation and concentration of an element is dependent on the component elements in the matrix of the sample and is not necessarily a linear function. It is feasible that a mathematical expression may be worked out to account for the relative matrix absorption and excitation effects for various classes of alloys.

The accuracy of ultimate analysis appears to be independent of such factors as grain size and degree of cold work.

There is little doubt that the x-ray fluoresence



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analyzer is slated to become an important addition to the existing methods of chemical analysis. It is expected that certain modifications in the present design of the equipment and the elimination of certain variables will enhance the versatility of the unit and will eventually bring its accuracy within the limits required in routine quantitative analysis of metals.

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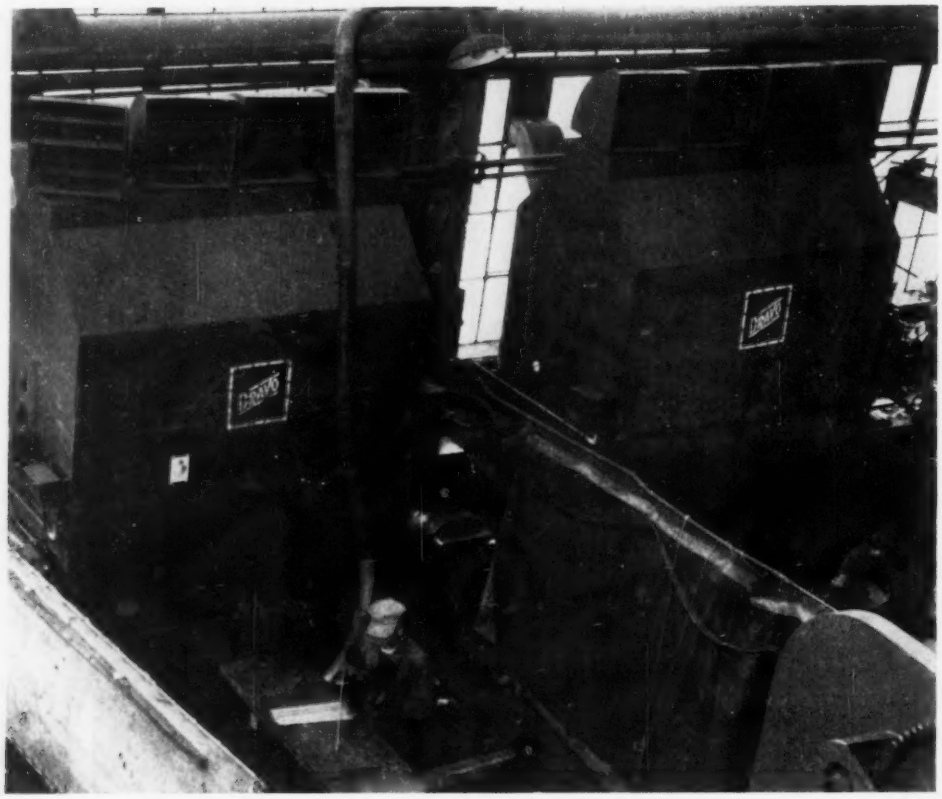


WELDING FUMES REDUCED

. . . by ventilating method using direct-fired heaters

Two of the four direct-fired heaters which warm the work area and simultaneously exhaust welding fumes through high bay windows

WELDING fumes are effectively removed from a block-long Chicago factory building by means of four high-velocity, direct-fired heating units. The building is the plant of Dreis and Krump Mfg. Co., one of the nation's largest makers of forming dies and steel press brakes.

Built 25 years ago, this factory is 480 feet long by 95 feet wide with brick walls, wood roof and concrete floor. An open balcony extends around part of the building. During the summer months, natural draft from open windows and doors carries away most of the welding fumes through high (39-foot) bay windows. The existing heaters, however, were inadequate to compete with the draft during the winter. In addition, large quantities of warm air were lost through the roof. The working zone became uncomfortably cool and an excessive amount of fuel oil had to be used. Moreover, the factory frequently became so "foggy" that visibility was impaired.

New method of ventilating, as worked out by the firm's engineers, is effective in both summer and winter because the same equipment is adaptable for use irrespective of season. The objective is to bring sufficient quantities of fresh air into the building to keep the working area under pressure, thereby helping to expel welding fumes out of the high windows.

In winter, the cold air is warmed by four oil-fired Counterflo heaters, manufactured by Dravo Corp., Pittsburgh. Each heater has a capacity of 2 million Btu per hour. Air is drawn into the heaters through louvered openings in their bases. Each heater is capable of handling about 22,000 cubic feet of air per minute.

Air is first passed over two staggered banks of economizer tubes leading from the combustion chamber to the vent stack. The preheated air then sweeps the stainless steel combustion chamber and is discharged into the working area at a velocity of approximately 2000 feet per minute. Temperature of the air entering the heater is raised in the process approximately 80° before being discharged. The four louvered directional discharge nozzles on the heaters are 12 feet above the floor.

As the warmed air is blown into the working zone of the factory, welding fumes are forced up to the roof windows. In the summer, only the fans in the heater are operated and the ventilation is equally effective. Installation of the equipment was a simple operation. Since each heater is self-contained, it required only power line, vent stack, fuel line and intake duct. Two of the heaters are mounted together at one end of the building, another is placed at the opposite end and the fourth serves an annex.

—o—

Available from the Engineering Experiment Station of Ohio State University is bulletin No. 133, "Some Studies of Ohio Coals, Shales and Oils," by T. H. Kerr, associate professor at the station. Included are sampling and testing procedures for various types of coal and material on low temperature carbonization of coal. Testing and classifying, grades and standards are also described.

Happy thoughts for holiday profits

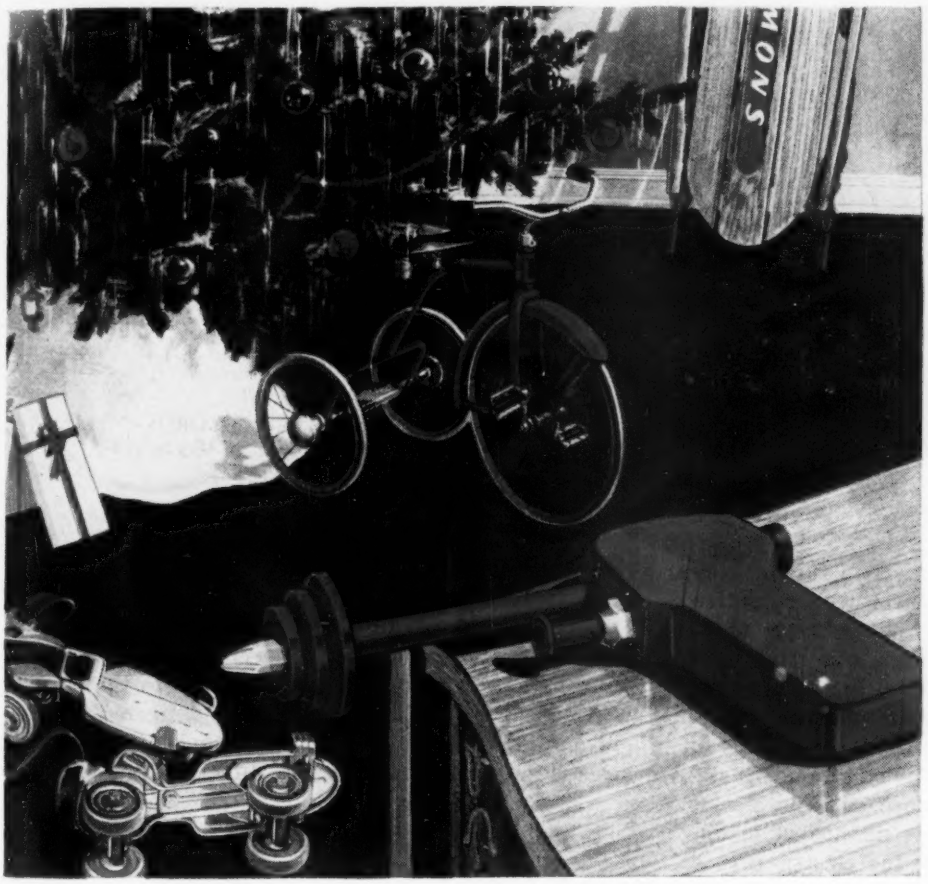
LOOK BEYOND the "yippees" of delight that greet these toys on Christmas Day . . .

You'll find their elated manufacturers closing one of their biggest, brightest seasons.

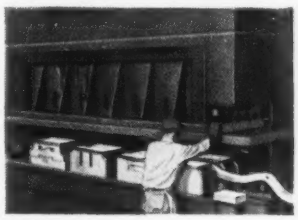
For each toy, in its way, is better, stronger, safer and *a bigger hit* than one of other years, thanks, in part, to the happy thought of using Bundy Tubing.

See the barrel of the water pistol . . . and the sled runners? Or the spacers between the roller skate wheels and the tricycle frame? These are only *hints* of how Bundy helped spell bigger holiday sales.

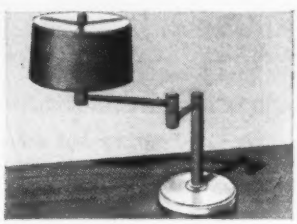
Better check into Bundy yourself. You'd be amazed at where you can use this miracle tubing of industry. The examples at the right range from some standard uses of Bundy to some new ideas well worth pondering. Study them carefully.



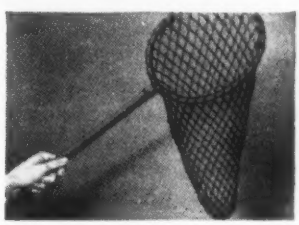
1 **Double-walled,** tough and vibration-proof, Bundyweld* steel tubing is in hydraulic brake line systems of 95% of today's trucks and cars. If *your* pressure lines must take a beating, better think of Bundy, too.



2 **Bundy is** a top performer in the machine tool field, too . . . as a tubing for coolants, lubricants and pressure lines. Bundyweld* is double-walled from a single strip. Available in steel, Monel or nickel.



3 **Wherever** it's used, from umbrella stems to lamp shade frames and lamp arms, Bundy gives a plus in profits or design. It's thinner-walled, lightweight, machineable, ductile. Which reminds us . . .



4 **If you make** fishing tackle, why not check into Bundy for landing net frames? We've never seen Bundy used this way, but it's a suggestion that might start *you* toward an even sturdier, better product.

5 **Or here's** another idea: doll carriage chassis of Bundy for still *more* toy sales next Christmas. If you're interested, we'll be glad to work with you. No other tubing offers so many profitable possibilities.

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6 **WHATEVER YOUR** design or production problem, whatever the idea you may be wrestling with, there's more than an even chance that a simple application of Bundy Tubing can help you put it over, and lead you to a better product, made faster, more easily and at less cost. Why not see what Bundy engineers can do. Just call or write: *Bundy Tubing Company, Detroit 14, Mich.*

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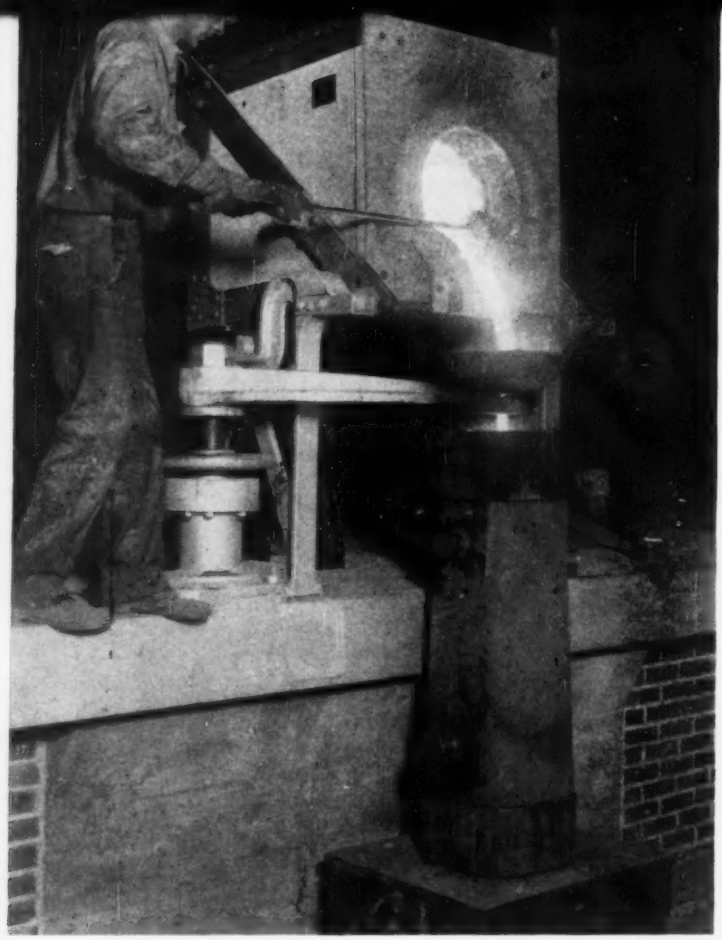


Fig. 1—Pouring hot metal from high frequency induction furnace

Production of ELECTRIC ARC FURNACE STEEL

Many years ago the electric arc furnace was considered a process for production of high cost-high quality steels only. Tool steel producers were the first to accept it for commercial production, but as experience was gained and costs decreased, the field of its application greatly expanded. It has made possible production of stainless steels which have not been successfully made by any other process

By WALTER M. FARNSWORTH
Assistant District Manager, Central Alloy District
Republic Steel Corp.
Massillon, O.

BEFORE development of the electric furnace on a commercial basis, crucible steel was considered supreme in the field of quality steels such as are used for tools, dies, watch springs, etc. Melting in crucibles is the oldest method used in the manufacture of special steels. The bessemer and open hearth processes that came into use after the middle of the 19th century were not capable of producing steel of high enough quality to displace crucible steel in its special field. This very costly method of making steel has now been displaced by the electric furnace process.

The crucible process briefly consisted of charging special selected low phosphorus, low sulphur scrap packed with charcoal or some form of carbon into crucibles. The crucibles were made of clay or a mixture of graphite and held from 90 to 120 pounds of metal. After packing, the crucible was covered and luted around the top then placed in a flame fired furnace and heated until its contents melted. The tightly covered crucible protected the metal from both oxidation and harmful gases of the flame fired furnace. After melting the contents of the crucible was poured into molds.

Metallurgical advantages of refining steel by means of electric heat was recognized early in the 19th century, but development of the electric furnace on a large scale was not possible until electrical engineers had succeeded in producing sources of current which could be furnished economically, continuously and of sufficient capacity. The earliest instance of the application of electricity to metallurgy is a patent granted on March 16, 1853 to the French chemist, Pichon. It was specially directed to the inventor's claim of economical application of the electric arc for melting of minerals and metals,

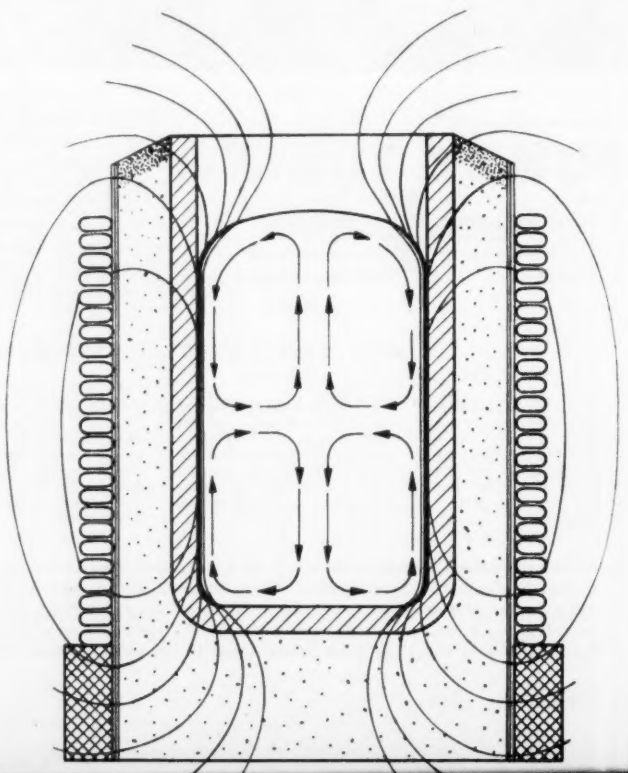
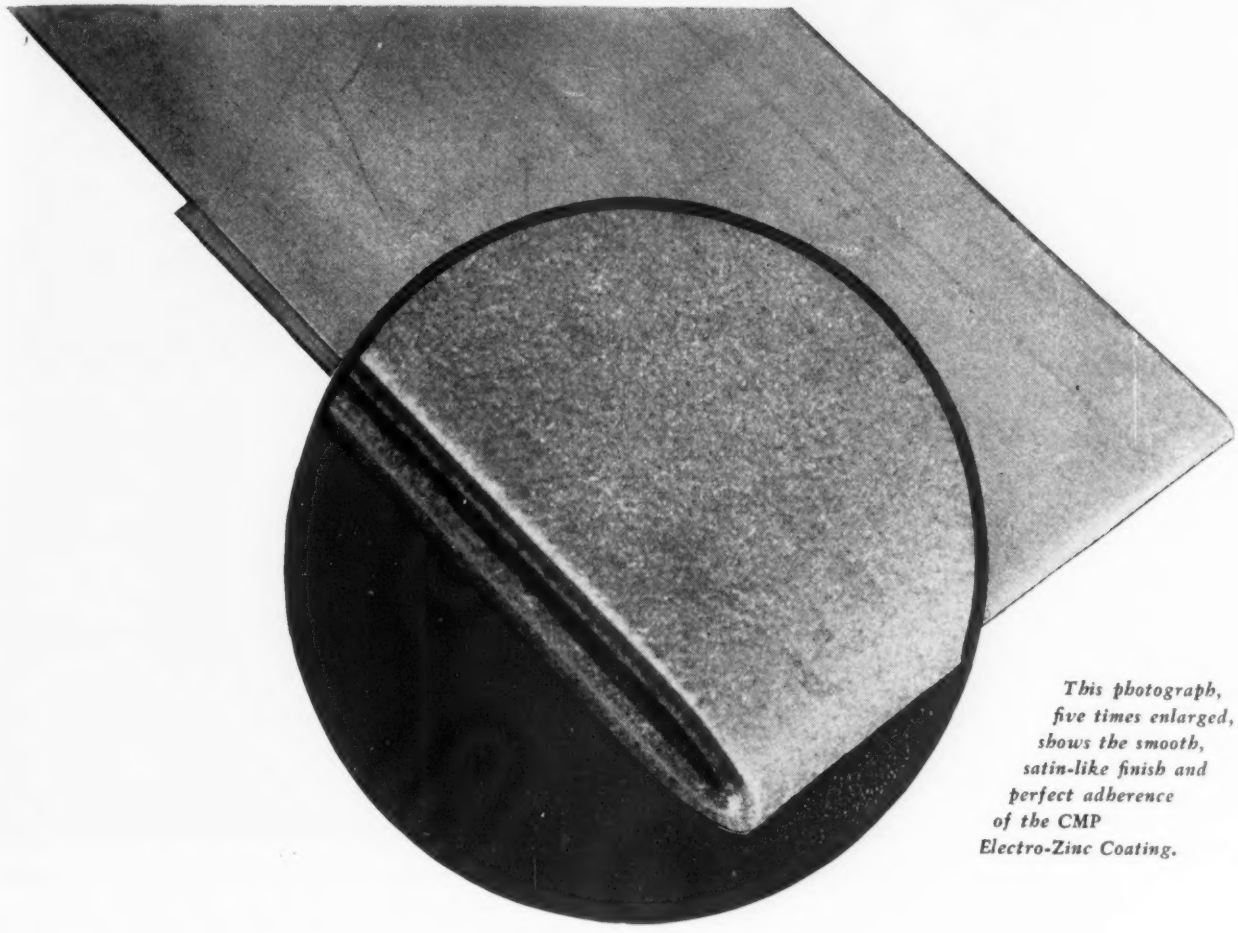


Fig. 2—Cross sectional view of high frequency induction furnace



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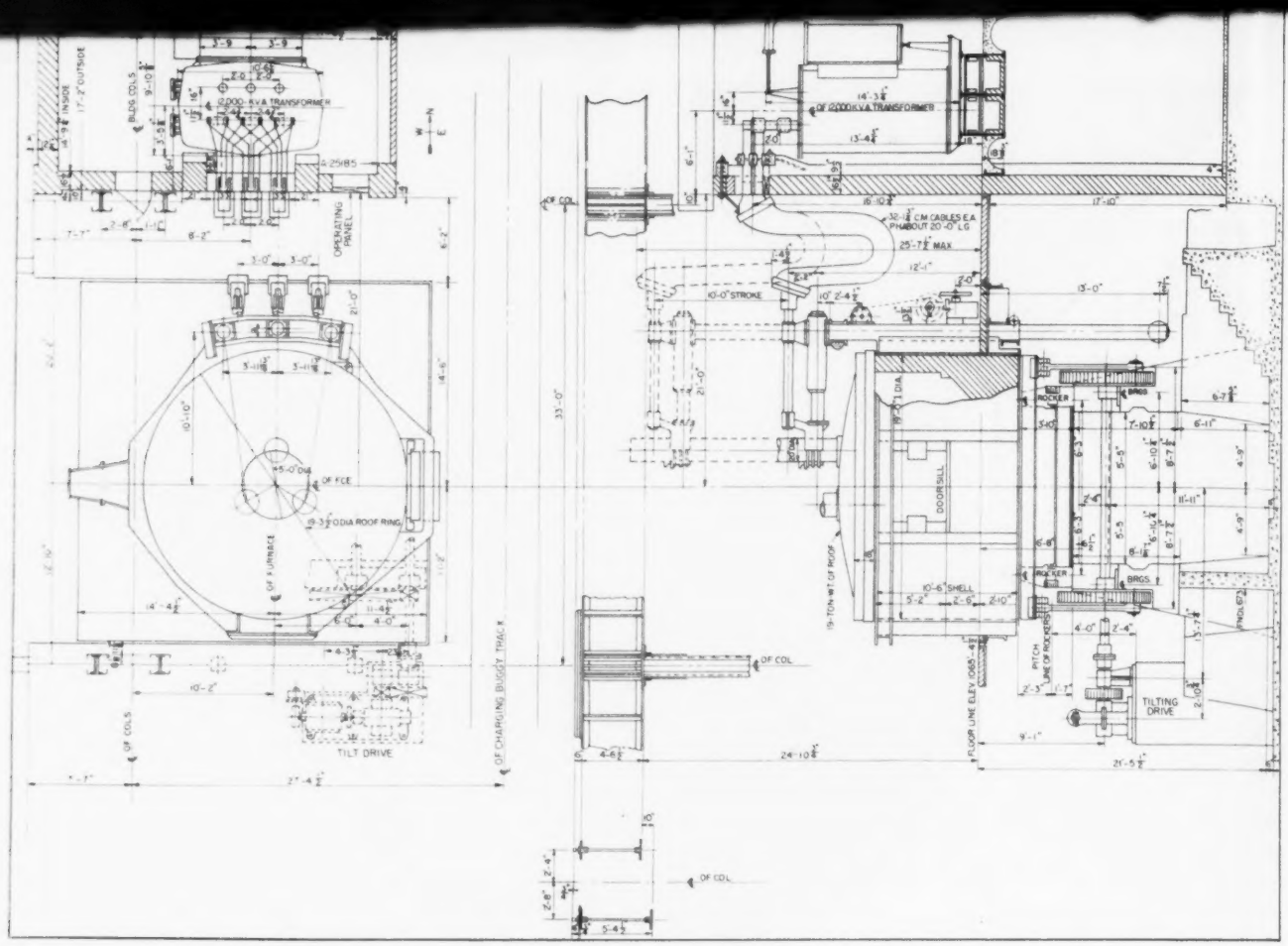

Fig. 3—General arrangement of 60-ton electric arc furnace, sub-station and building

chiefly those of iron. This patent was premature as sources of power generated by electric magnetic machines of that period were not of sufficient capacity to introduce electricity for general use. The important steps forward took place after the discovery of the dynamo in 1867.

The first practical application of electric current to the melting of steel was made by Sir William Siemens in England in 1879. He used a crucible with two horizontal electrodes extending through the walls to form an arc over the metal charge. Constructed on this principle, the Siemens furnace attained a high degree of perfection. Electrodes were automatically controlled to keep the arc length constant. The reason for failure of the Siemens furnace on a commercial scale lay in the fact that electric current was too expensive; it cost too much in those days to be of any appreciable use in melting iron in electric furnaces.

There followed developments of more or less importance until 1888-1892 when Heroult of France developed his electric furnace for manufacture of ferroalloys and calcium carbide. From this previous experience Heroult developed his steel melting furnace. Primary interest of the inventors was to improve efficiency and lower the cost of electric melting. Siemens applied the arc indirectly, that is, the arc was formed over the charge and the bath was heated by radiation. He also developed a direct arc furnace using a bottom contact. Heroult's three phase direct arc method eventually proved to be the more efficient.

An altogether different principle of applying electric energy in the art of heating was developed by Kjellin in Sweden, who in 1900 devised an induction type furnace. In it the metal to be melted was placed in an annular ring within which was placed a primary coil to form a transformer circuit, making the metal in the ring the secondary circuit. In this method, known as induction heating, high voltage current is transformed to a low voltage-high amperage current. The metal carries the high amperage current and when sufficient current is applied the metal is melted. Further improvements on this type of induction furnace were also made by Frick in 1908.

A long list of inventors developed various means

Fig. 4—Detail of brick lining and roof for 60-ton electric arc furnace

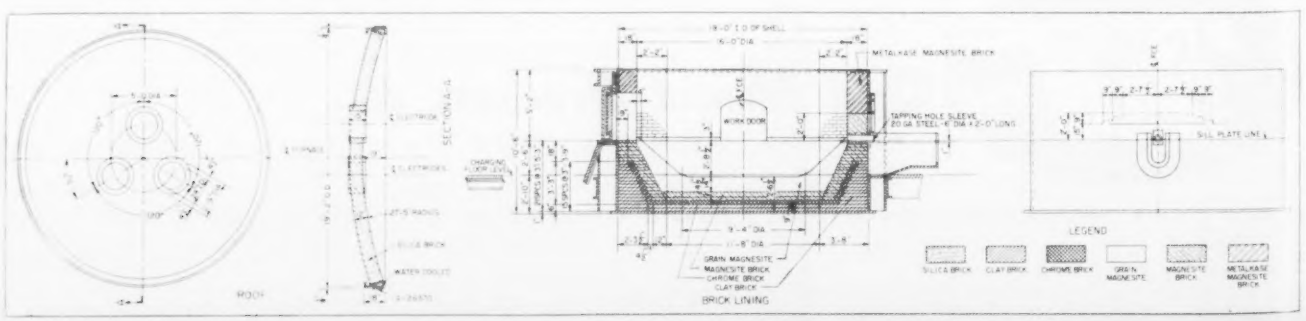

Fig. 5—Arc furnace control panel—rheostats are set for desired load current which regulators hold without further attention from the operator

of applying electricity using indirect and direct arcs and with nonconducting and conducting furnace bottoms. Others worked on the induction principle for developing heat.

Prior to 1900 all developments took place in Europe and in most cases close to a source of cheap water power electricity. The first electric furnace, a Heroult, was installed in America in 1904. In years following there were other types of European furnaces, and some of American design installed in the United States but the three phase direct arc furnace as originally developed by Heroult is the only arc type furnace that has stood the test of time and competition.

Since Dr. Edwin F. Northrup developed the principle of high frequency induction melting in 1916, it is believed that no basic principle for developing heat by electrical energy has been overlooked in the art of electric melting. Vast sums have been spent, and the history of the electric furnace process reveals the effort that has been expended in perfecting it.

The high frequency induction furnace has found particular favor in specialty melting, and where it is advantageous to melt in small batches, such as special high alloy mixes, ferrous and nonferrous

THE FUNDAMENTALS OF STEELMAKING

This is Part I of the first of a series of 27 articles on making steel and finishing it into products ready for the consumer. Watch for additional articles in this interesting and informative series

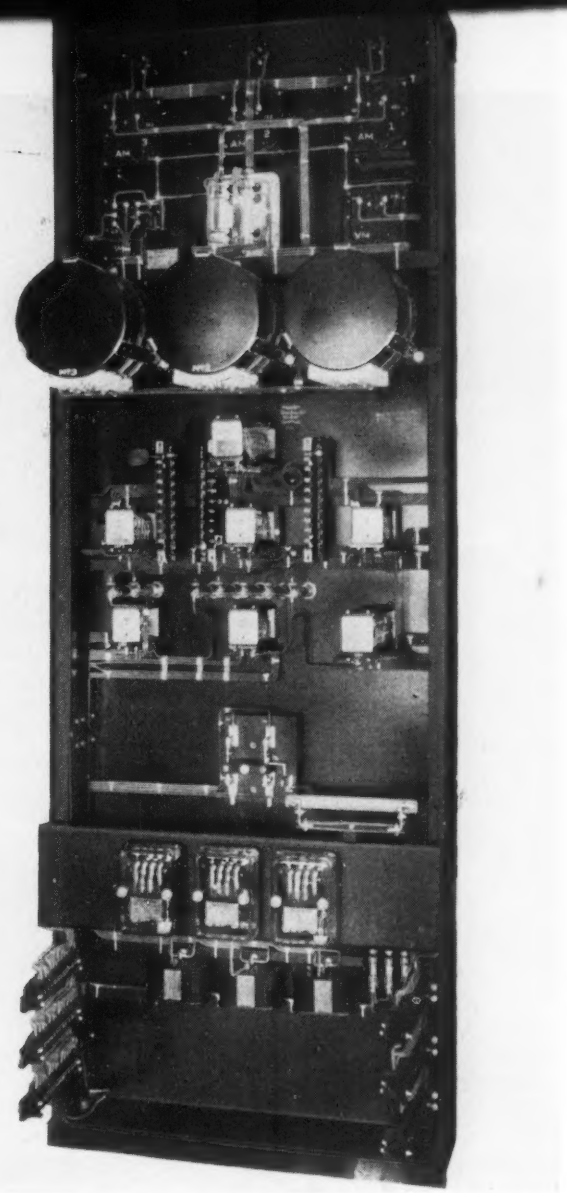

Fig. 6—Rear view of modern arc furnace operator's panel

metals, also for pilot heats, laboratory melts and for vacuum melting. This type melting furnace has a very important place in industry and its use is continually being expanded.

The arc furnace by far predominates the field in large tonnage melting. They are built in various sizes ranging in capacities from 500 pounds to 100 tons. High frequency induction furnaces are available in capacities from a fraction of a pound to half-ton unit for melting nonferrous metals and to 8 and 10 ton sizes for steel melting. Their fields of use overlap to some extent. Large arc furnaces have a definite advantage from a standpoint of capacity in tonnage production while there are engineering problems yet to be solved in going to larger size induction furnaces.

In the beginning the electric furnace was considered a process for the production of high cost-high quality steels only. The tool steel industry was the first to accept it for commercial production, but as experience was gained and costs decreased, the field of its application greatly expanded. It has made possible the production of stainless steels which have not been successfully produced by any other process.

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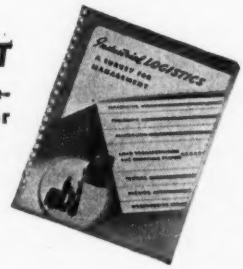

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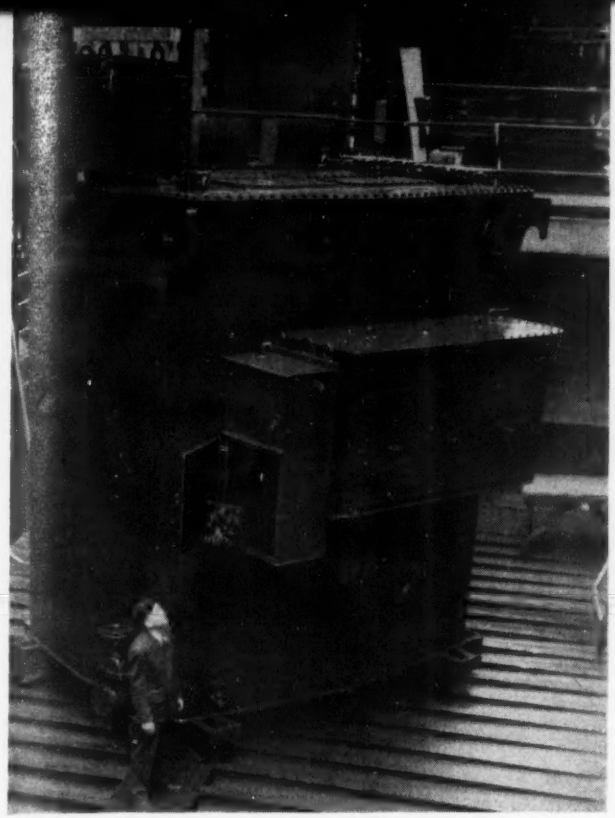


Fig. 7—Arc furnace transformers must be of heavy construction in order to withstand widely fluctuating currents

The arc furnace has to a large extent replaced the small open hearth and converters used in foundries. Capacities in this field are calculated to be over 2,000,000 tons yearly. In most cases the acid-lined electric furnace, because of its greater flexibility and improved practices, has proved more economical than small open hearths or converters in the production of steel for castings.

Electric arc furnace steel ingot production capacities are now estimated to be in the neighborhood of 5,329,000 tons per year. It cannot be said at the present writing that the modern arc furnace can compete with the larger open hearth furnace in the production of common steels, but this goal may be closely approached with the current progress in electrical equipment, larger transformer capacity and improved operating practices.

Electric current has no effect except as a means of heat. The heat provided by electric current does not need an oxidizing atmosphere to support combustion as is necessary with other fuels; this permits a control of chemical reactions not possible in other steel making processes. The carbon arc is pure heat. The manner of bringing the heat into the furnace through the electrodes makes possible a tight furnace which permits execllent reducing conditions and close control of metallurgical reactions.

Several makes of modern arc furnaces today are similar with respect to shape and electrical design. That is, they are cylindrical, of the standard three phase, three electrode series arc type as originally developed by Heroult. The basic differences of construction are in mechanical design. Some of these are in the application and arrangement of electrical equipment, method of tilting, and removable roof for charging.

Electric furnaces can be either basic or acid according to the lining. In acid practice the furnace hearth is lined with silica brick and sand or ganister. The acid lining does not offer the flexibility of a basic lining as the slags formed must be of the acid type and do not function to remove phosphorus and sulphur. Acid practice is widely used in foundries for the production of castings. The basic hearth is lined with magnesite or dolomite and permits lime slags to be formed for the removal of sulphur and phosphorus. Because of its greater flexibility, basic practice is commonly used in the production of ingots.

It may be said that the so-called 70-ton furnace is the standard large unit today. This furnace has a holding capacity of 170,000 to 180,000 pounds. The shell is 20 feet inside diameter, has a flat bottom and is mounted on rockers. It is tilted forward for tapping and backward for slagging off by means of a motor operated crank type mechanism. The furnace shell has two doors; one called the charging door, is diametrically opposite the tap hole. The working door is 90 degrees away and is diametrically opposite the center line of the furnace mast. Both openings have doors, door frames and arch and jamb supports, all of which are water cooled. The furnace rockers rest on heavy steel castings that serve as tracks. Rockers and track are provided with teeth that mesh into each other, thus preventing the furnace from creeping when tilted. The weight of the furnace is supported on concrete piers in which the tracks are imbedded. These supporting concrete piers are far enough apart to allow space for a slag pot to pass between the rockers.

An arm carrying 20 inch diameter graphite electrodes extends from separate vertical masts that travel up and down permitting a relatively long stroke for raising and lowering the electrodes.

Electric furnace transformer capacity varies with

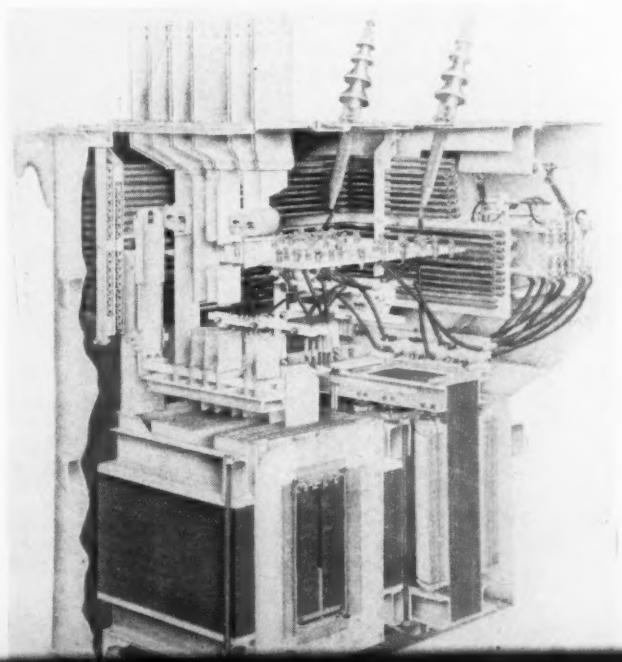
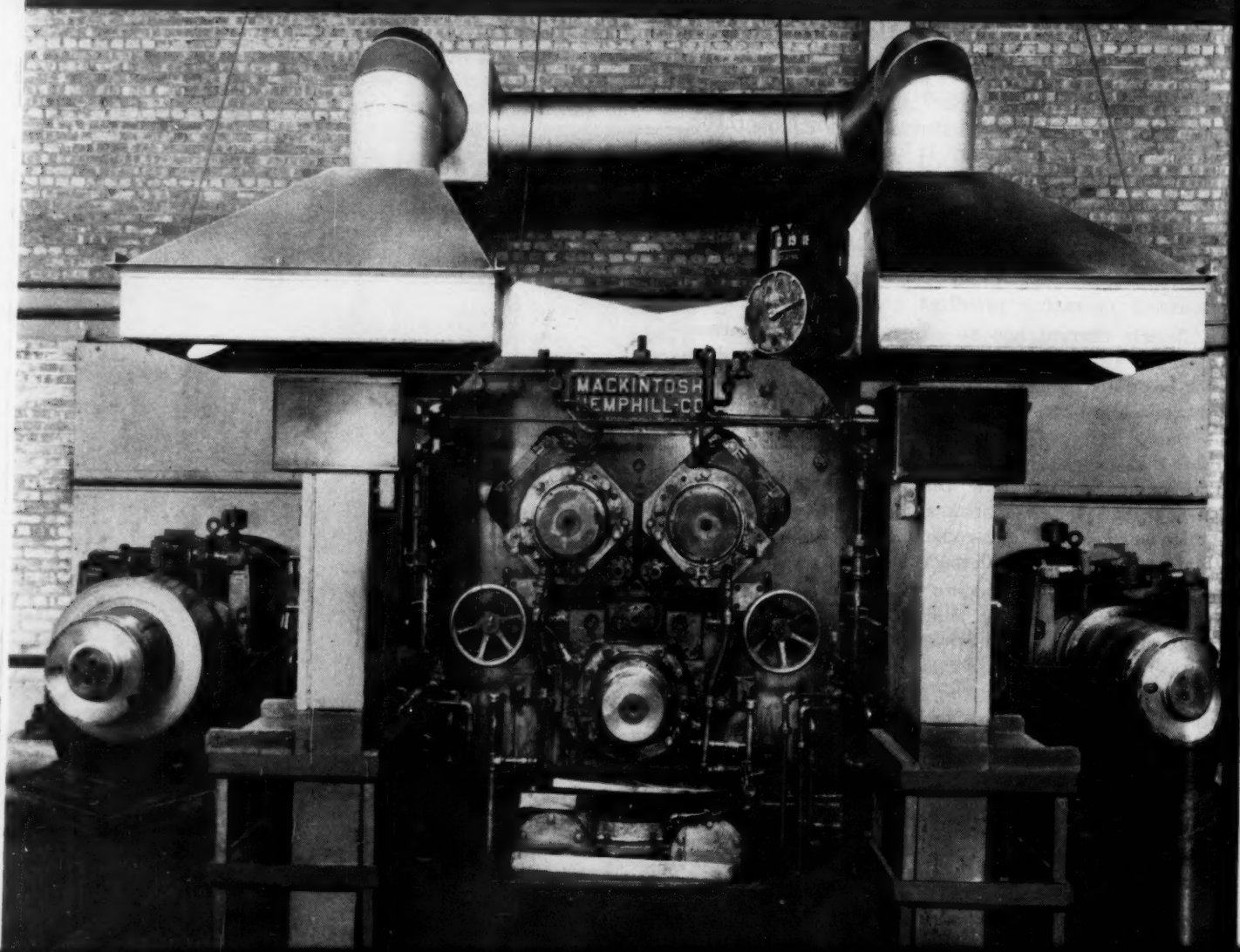


Fig. 8—Phantom view of an arc furnace transformer of latest design

Versatility and productive capacity key features of Y-type reversing cold strip mill

Mackintosh-Hemphill Y-Mill, a 7-Roll reversing cold strip mill utilizing small-diameter work rolls.



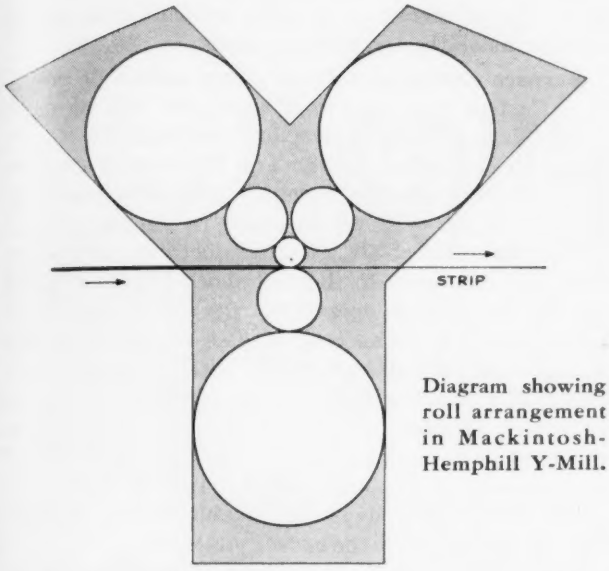


Diagram showing roll arrangement in Mackintosh-Hemphill Y-Mill.

Designed for high-speed rolling of all grades of steel, the Mackintosh-Hemphill 7-Roll reversing cold strip mill employs small-diameter work rolls for reducing hot-rolled strip to commercial cold-rolled gauges.

The Y-type arrangement of the rolls in a compact, rigid housing results in increased penetration ability over a 4-high mill, with equivalent surface finish and greater accuracy of gauge.

Characteristics of the Mackintosh-Hemphill Y-Mill include—

- Low Separating Force Between Work Rolls
- Long Roll Life
- Operates at 1200 Feet Per Minute On Finish Passes

This modern mill for modern metals can be used in rolling all grades of steel and non-ferrous strip, and is particularly effective in reducing the higher-carbon steels. In actual operation the Mackintosh-Hemphill Y-Mill has demonstrated these advantages—

- High Productive Capacity on Hard Metals
- Elimination of Intermediate Anneals
- Uniformity of Product Rolled
- Simplicity of Adjustment and Operation

If you process commercial tonnages of strip, or plan to increase your rolling capacity, there's a place in your productioneering program for a Mack-Hemp Reversing Cold Strip Mill; Mackintosh-Hemphill engineers will show you how well the Y-Mill fits your requirements.

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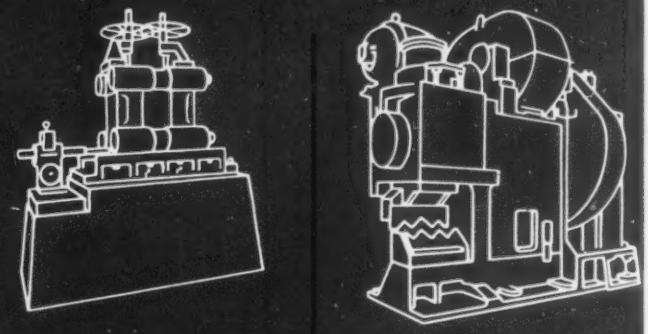
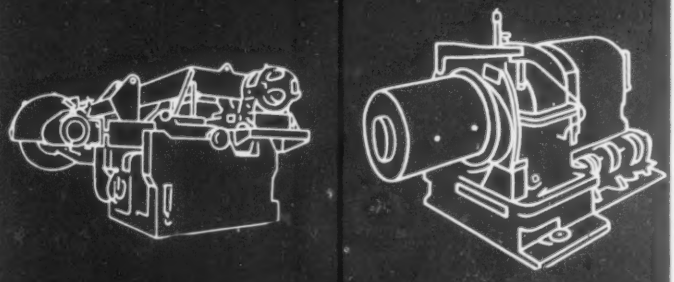
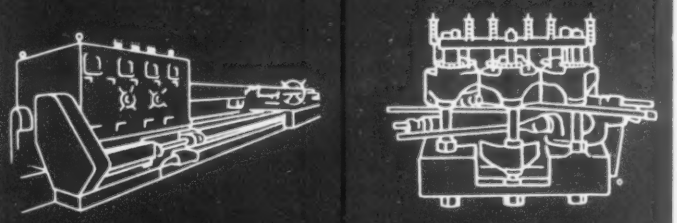
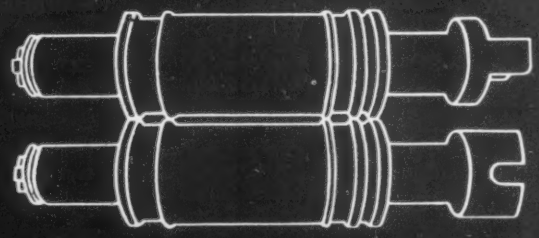
Some of the widely diversified types of production machinery manufactured by Mackintosh-Hemphill for the metals industry.









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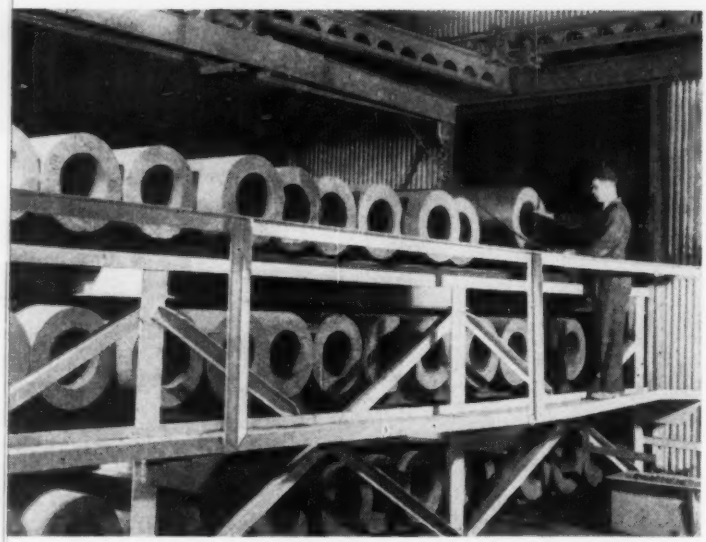

Fig. 9—Graphite electrodes in place in storage racks

the size of the furnace. The 70-ton furnaces use a 12,500 kilovolt-ampere or 15,000 kilovolt-ampere transformer, equipped with a wide range of secondary voltages controlled by a multiple position tap changer. Transformers for electric furnace service are in general similar to standard power transformers, but require heavy construction and heavy bracing of windings for mechanical strength in order to withstand the widely fluctuating currents.

Primary voltages in electric furnace installations may range from 2200 to 33,000 volts. Secondary voltages may be obtained in steps of 15, from 100 to 300 volts. Of various secondary voltages available, only 4 or 5 are connected to the tap changer and are set to best suit melting conditions. For example, 300, 270 and 240 volts with full kilovolt-ampere capacity may be used for the first stages of melting and 180 volts and 140 volts at reduced kilovolt-ampere capacity for completion of melting and finishing of the heat. Voltages are reduced as melting progresses so as to avoid over-heating the furnace lining.

An automatic arc control regulator provides for quick accurate regulation of the power input. There is no complicated sequence of manual operation. Interlocking is provided to prevent the operator from getting into trouble such as operating the tap changer when the circuit breaker is closed. Rheostats are set for the desired load current which the regulator holds without further attention from the operator. An automatic regulator operates the electrode motors to adjust the position of electrodes, so that all current flowing in the arc in each phase will be balanced against the voltage from the electrode to the shell of the furnace. When this balance exists, electrode motors are brought to rest. Any scrap dropping in or boiling action present in the bath causes the motors to operate until the current is balanced. Electrodes can be raised or lowered manually by means of a master switch control which operates the motors at a higher than normal speed if desired.

On the furnace control panel are mounted three ammeters (one for each phase), a secondary voltmeter, an indicating wattmeter, rheostats, switches for the electrode motors, tap changer switch, circuit breaker switch, overload relay light indicators and a power factor meter. A graphic wattmeter is usually located inside the transformer room.

Furnace electrodes may be either carbon or graphite. Carbon electrodes cost about one-half as much as graphite but their electrical conductivity is only about one-fourth as great. For this reason graphite electrodes are used on furnaces with high power input. No other material possesses to the same extent the combination of electrical conductivity, refractoriness and resistance to thermal shock that is required for electric furnace operation. Carbon electrodes are made from anthracite coal or coke which is first calcined then ground and mixed with a pitch binder. From this mixture electrodes are formed to size in extruding presses. After forming they are baked in gas fired furnaces at a temperature of about 1800°F to carbonize the pitch binder. This operation requires over thirty days and is followed by machining and threading of the socket joints.

For graphite electrodes, petroleum coke is used as a base rather than anthracite coal. These electrodes are initially processed in the same manner as the carbon type. After baking, however, they are placed in electrical resistance furnaces and heated to temperatures over 4700°F. At these elevated temperatures the carbon atoms arrange themselves in the crystalline structure of graphite. This graphitizing operation requires four weeks. Hence the total time for producing a graphite electrode is approximately three months. These electrodes have threaded sockets machined on each end so they can be joined together for continuous operation if desired.

Diameters of the graphite electrodes used in relation to furnace size and transformer capacity are shown in accompanying table.

Because of the high temperatures and high lime slags carried in the basic arc furnace, linings and particularly the hearth have been given intensive

The steel business career of Walter M. Farnsworth started in the metallurgical department of Carnegie Illinois Steel Corp., South Works, South Chicago, Ill. After a short period, he was transferred to the electric furnace, where he advanced to the position of junior melter. He left South Works in 1920 to accept a position with the Timken Roller Bearing Co., as senior melter, in which position he served until 1925, when he joined the United Alloy Steel Corp. as superintendent of the electric furnace department. Through the merger with Central Alloy and later with Republic Steel Corp., he served as divisional superintendent of the Canton Steel Division, and in 1946 he was appointed to his present position as assistant district manager in charge of electric furnaces of the Central Alloy and Chicago districts of Republic Steel Corp.

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Cemented carbide tools have been a boon to metal-working industries in their ability to increase production and decrease costs. To do this consistently and at minimum expense for maintenance, they must have soundness and uniformity. These properties are attained to a marked degree in Kennametal by distinctive processing and precise laboratory control throughout every stage of manufacture—from refinement of raw materials to sintering of finished product.

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There are eight different grades of Kennametal, and a wide range of tool sizes from which to make selection for specific machining requirements, as listed in Catalog 48. You can buy Kennametal tools and blanks with assurance of highly satisfactory service. They are all efficient performers—money savers on production and maintenance.

Money—important tool of industry and trade—is an instrument for accurately evaluating the worth of goods and services in exchange activities only as it remains firm and trustworthy.

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Return to sound money—an honest medium of exchange★—will help stabilize our economy, put a curb on the potentially infinite use of currency, automatically check inflation and dangerous expansion of credit, and restore confidence. Individuals can then know with certainty the worth of earnings and savings; businessmen will be enabled to continue worthwhile enterprises with assurance. Palliatives may ease the pain of economic ills, but sound money is an effective cure.

★ **BILL H. R. 5031** introduced into the House of Representatives, January 20, 1948, by Congressman Buffet of Nebraska cited as the "Gold Standard Act of 1948."

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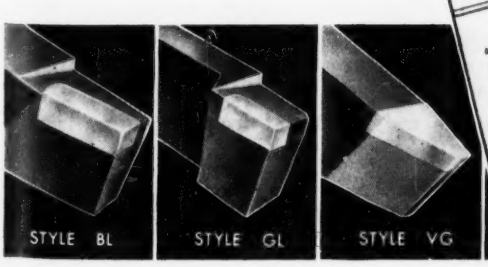

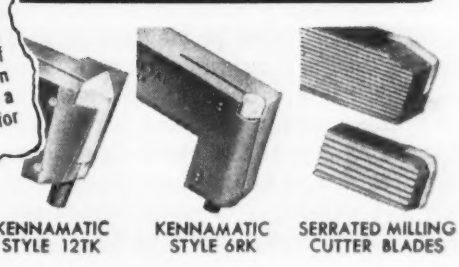

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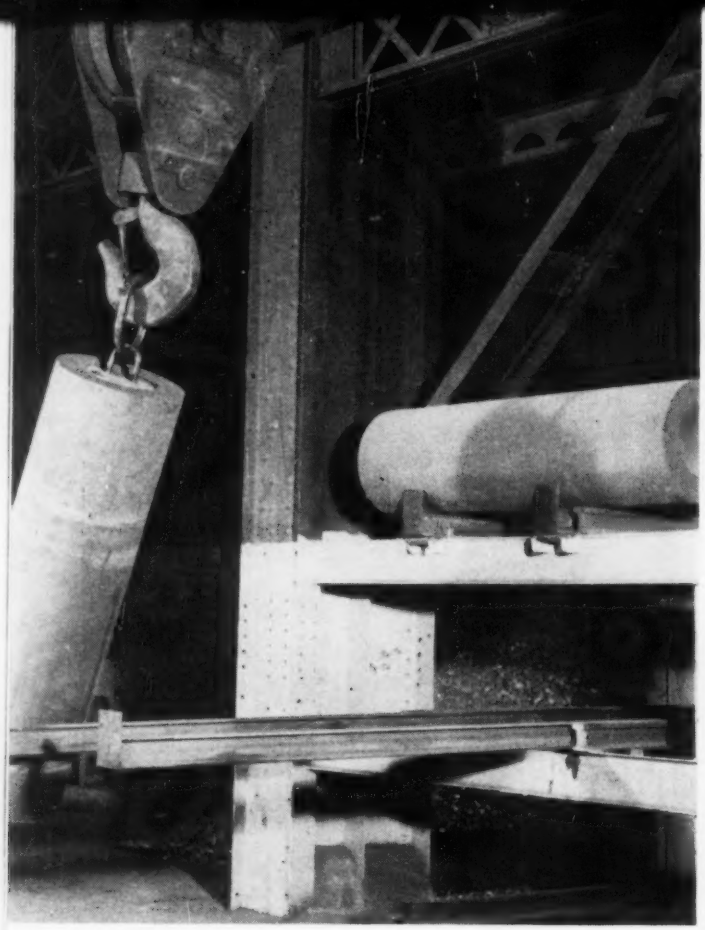


Fig. 10—Electrode being removed from storage rack by overhead crane

study. The hearth is subject to cracking and slag and steel penetration which are the sources of most difficulties.

The bottom of the furnace shell is usually lined with a flat course of fire brick or insulating brick on top of which is laid several courses of magnesite brick extending up the side walls to the slag line. The magnesite brick are stepped out from the lower shell so as to form a roughly bowl shaped sub-hearth. The side walls of the furnace are lined with unburnt metal case magnesite brick.

Formerly silica brick was used in side wall construction and in some cases is still preferred. The tendency of ordinary burnt magnesite brick to spall off when exposed to extreme temperature changes makes their use in side wall construction impractical. The metal casing on unburnt magnesite brick tends to fuse the brick together and to a large extent eliminate spalling. They are much more expensive than silica brick but give three to four times the side wall life. Silica brick are generally used in basic furnace roof construction.

For the furnace working hearth various grades of grain magnesite are on the market ranging from 65 to 90 per cent plus in magnesium oxide. A hearth high in magnesium oxide is most desirable because of its ability to withstand high temperatures required for refining molten steel and also sudden temperature changes as a result of charging cold scrap after tapping. It also exhibits less tendency toward contraction and expansion is more refractory. Grain magnesite is carefully sized with coarse, intermediate

Furnace Capacity Tons	Shell Diameter	Transformer KVA	Graphite Electrode Diameter
6	11'0"	2700	12"
15	13'6"	4500	14"
35	16'6"	10000	18"
60	19'0"	12500	20"
70	20'0"	15000	20"

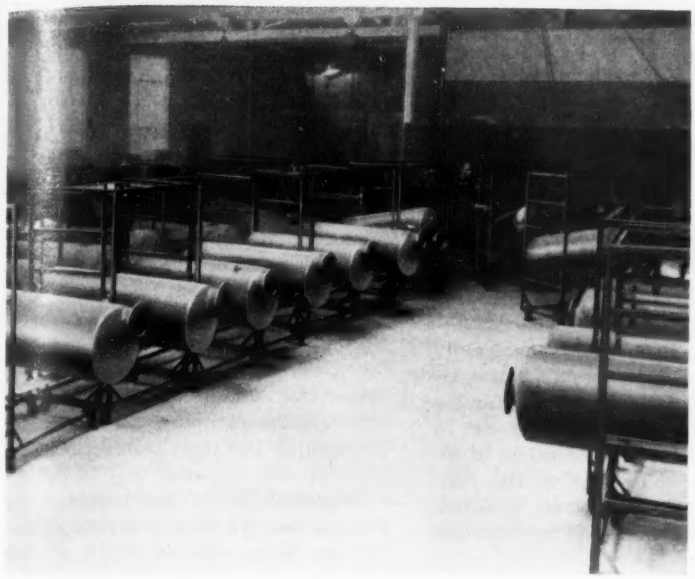
and fines to insure maximum interfitting of the grains so as to form an aggregate sufficiently dense to prevent metal and slag penetration but not so finely dense as to be subject to cracking. It is then mixed with sodium silicate or a suitable binder and rammed into place.

Following a ramming of the hearth, the furnace is dried out with a gas flame after which the arc is applied. Scrap electrodes are placed on the bottom to form a contact for the arc and the furnace temperature is brought up rapidly. After 36 hours of heating at a high temperature the hearth should be sintered to a depth of about 3 to 6 inches. It is then ready for use and will become completely sintered through after a short period of continuous operation. After each heat a certain amount of repair to the hearth is necessary, especially around the slag line. Burnt dolomite is used for this repair under normal conditions.

A good furnace hearth will last for years. The furnace side walls, built of metal case magnesite brick usually have to be replaced after about 200 heats. The type of steel produced and furnace practice have a marked effect on refractory life, particularly the roof. Heats that are finished under a strong reducing carbide slag are most severe on the silica brick roof. Depending on furnace practice and types of steel produced, roof life may vary from 35 to over 100 heats. The arc furnace roof is built into a round steel band or ring having the same diameter as the outside of the furnace. A water cooled *skew* back forms the lower edge of the roof band that rests on the furnace. Water cooled coils are placed on top of the roof around the electrode openings to form a seal. Refractory service around furnace openings is particularly severe. The roof can be lifted in its supporting band and placed on the furnace and a spare is always kept available for replacement.

So far experiments with basic brick and high alumina brick have not proven entirely satisfactory in electric furnace roof construction but extensive study is being given the problem at the present time and much progress is being made. Silica brick are light and will support their weight at high temperatures over a wide arched span while in similar arch construction the heavier basic brick and alumina brick spall and break off at high temperatures.

At the present time there is an all-basic open hearth furnace in operation in one of the large steel plants in the Chicago district which has created wide interest throughout the steel industry. In this furnace basic roof brick are suspended or held in place with hangers so that the individual brick does not have to bear the weight of the arched span as is the case in conventional roof construction. This is mentioned as an example of the constant search for improvement in manufacture and utilization of refractories for furnace construction.



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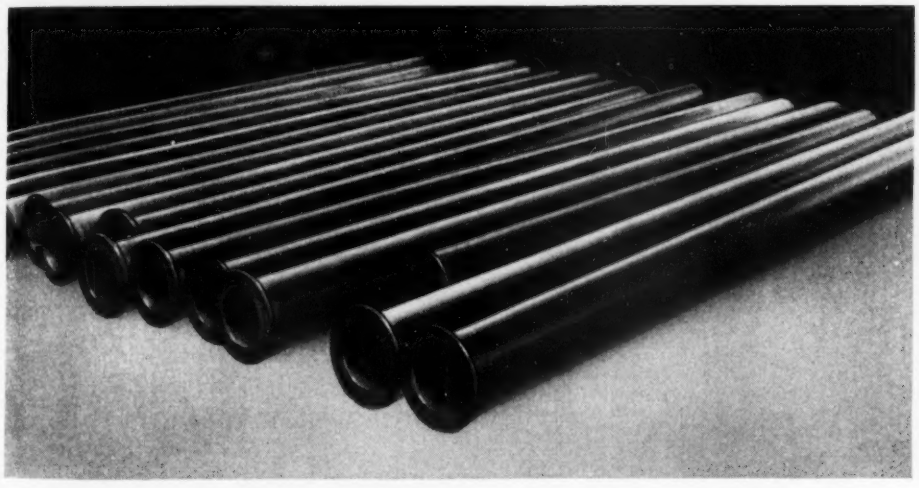

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PLANT storage areas and other materials handling aids can be set up by following "erector-set" procedures when employing a unique type metal framing currently manufactured by Unistrut Products Co., Chicago. Success of the framing stems from eight basic fittings which, when used with U-shaped steel struts, make possible innumerable connections.

Components of the framing are so flexible that a user can throw up stockroom shelving, pipe and cable hangers or build assembly and conveyor tables, machinery and electrical equipment mountings, pallet and many other racks almost at will.

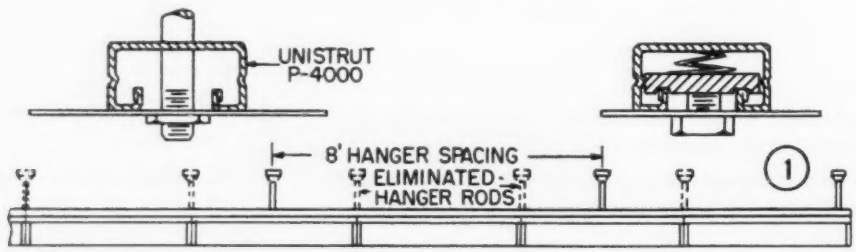
Framing itself is made in five different sizes from 19 to 12-gage steel. These are capable of handling uniform loads—on a 36-inch span—ranging from 35 to 1400 pounds. Only tools required in assembling the U-shaped channels is a hacksaw and a wrench. Once the framing is cut to required size, assembly consists of inserting a clamping nut in the continuous slot of the strut involved, and tightening the cap screw through the fitting into the nut.

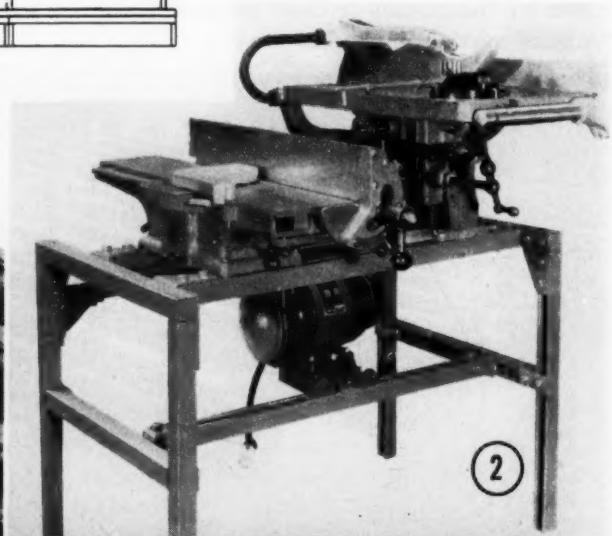
According to the company, all structures made with these components are completely adjustable at any time. Assemblies also can be taken down and rearranged for other purposes inasmuch as the materials are 100 per cent reusable.

Fig. 3 shows a heavy die storage rack built with the framing. Each shelf shown may be individually adjusted to any desired height. Machine mounting in Fig. 2 clearly shows adjustability features as well as some of the fittings used in the connections. The sketch, Fig. 1, indicates how the framing reduces the number of hangers usually required when used for suspending fluorescent fixtures. Also shown is the clamping nut responsible for making the rigid connections.

—o—

Brazed-on tools for planing cast iron on planers having a clapper box lift are being offered in two styles by Kennametal Inc., Latrobe, Pa. Style 15PM is a square nose tool for finishing when feed per stroke is almost as great as tool width. Style 16PM is a round nose tool for planing in a trough by plunging and feeding both ways. Both are offered in various sizes and have tips of Kennametal grade K1.





Welded Box Car

By J. E. CANDLIN JR.
Asst. to Chief Engineer
and
C. G. DELO JR.
Design Engineer
Pullman-Standard Car Mfg. Co.
Chicago

Engineered for Mass Production and Lower Costs

Special fixtures and automatic processes are combined to assist in relieving critical shortage of cars vital for moving goods. Design conforms to American Association of Railroads standard for strength, thickness and type of material

SINCE the amount of production possible in the United States is a direct function of the facilities for moving material, the welfare of the country depends heavily upon the American railroad industry. Today, the box car shortage is one of our most critical difficulties and the need for the mass production of box cars is recognized as being essential to our industrial system.

Present standard box car is a steel sheathed car dating back to 1932. It is made of riveted steel with a center sill joined from two rolled sections by arc welding. About 10 years ago several attempts were made to produce a welded lightweight car by the use of a high strength steel, but the standard riveted car continued in popularity.

During the last few years in which prices have been rising, a renewed attempt has been made to improve the box car and to reduce costs by arc welding. This was a combined effort of the engineering and production men of the Pullman-Standard Car Mfg. Co., Chicago.

This time, reduction in weight has not been emphasized. The American Association of Railroads standard car has been used as a basis for strength, thickness and type of material. Because of the critical need for more box cars, the present welded car has been engineered for mass production and attending low costs. Automatic processes have been used extensively so as to eliminate high labor costs and to keep a better control over the product.

Car Dimensions—Size of this car is standard with inside dimensions being 40 feet 6 inches long, 9 feet 2 inches wide and 10 feet 6 inches clear height. It weighs approximately 44,000 pounds and has a maximum capacity of 125,000 pounds and 3900 cubic feet.

Underframe of the car consists of the usual parts. Center sill comprises two Z-26 sections arc welded together. This member is subject to tension and compression forces received by adjoining cars through the coupler and draft gear. Pocket for draft gear cushioning device is installed by welding in the end portions of sill. Ends of the center sill are protected by a striker assembly which receives oversolid blows by the coupler.

Load Distribution — Vertical floor loads are distributed to the longitudinal members, side sill, floor stringers, and center sill, by the crosswise floor planking. Floor stringer loads are resisted by each cross member. Cross ties carry these loads to the side and to the center sill, and it is supported by cross bearers which carry these reactions to the side of the car. Sides, in turn, are supported by the bolster, where the whole weight is transferred to the truck.

Rolled Z-bar floor stringers are made continuous members through the center section of the car, and they bear directly on the cross member supports, where they are arc welded. The crossties are pressings. The crossbearers are automatically arc welded I-shape sections welded to the center sill. Welded spreaders are used between the webs of the center sill to effect continuity of the crossbearer.

Box construction with automatic arc welding is used for the bolsters, because of the need for certain horizontal bending strength. This member must resist vertical bending forces from the truck and also must serve to distribute buffing forces from the coupler. The center filler is a weldment which serves as a backing structure for the centerplate reaction from the truck. Rivets are used where they facilitate assembly of the various parts. The standard car uses steel castings for centerfiller, rear draft lugs, front draft lugs and striker; riveted construction is used throughout the underframe.

Weight Support—Sideframe of a box car is a deep girder which supports the whole weight of the car between trucks. Design used is, in principle, the same as the standard except that automatic welding is used instead of riveting. The sheet is attached at top and bottom of side with a continuous fillet weld, and the sheets are joined together at the intermediate posts by continuous butt welding. which serves to attach the post because of the penetration achieved.

Because of the large door opening, a heavy reinforcement below the sidesill is necessary, in order to carry shear across the opening. The side sheet carries the shear loads at all other points. The side posts act

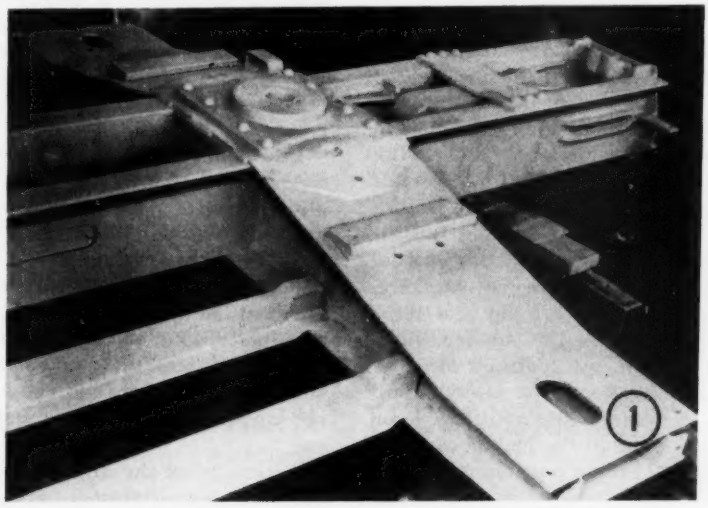


Fig. 1—Completed body bolster assembled into the underframe

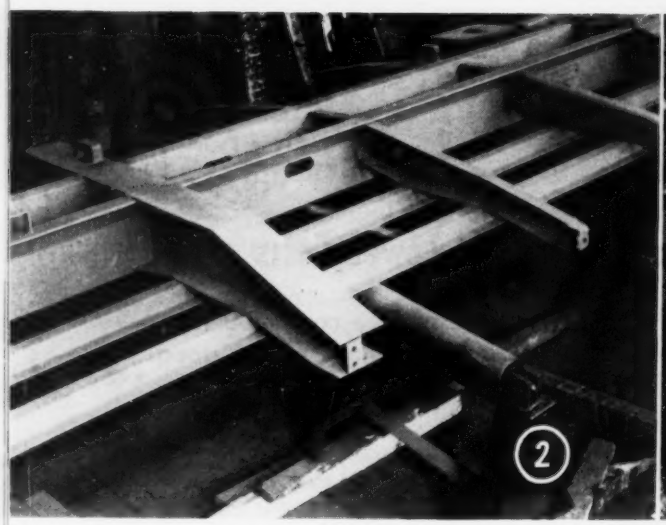


Fig. 2—Crossbearer assembled in an underframe. A single welding fixture is used to position both top and bottom plates on the web

Fig. 3—Underframe jig is an air actuated fixture that clamps component parts in correct position in the overall structure

as stiffeners for the girder sheet but also must resist the bulging forces of bulk loading and axial loads from the underframe. This was all previously riveted.

Welded Roof—Roof construction is entirely arc welded by automatic means. The roof members, "carlines," are made from a bulb-shaped section which is hot-rolled. The roof sheets are joined together and joined to the web of the carlines with a single butt weld with penetration. Roof sheets and carlines are welded to side plate member with fillet welding. Panshaped pressings are introduced into the roof sheet for stability. The carlines must carry bending loads because of the weight of the roof plus running board loads, and must also help the roof sheet to resist the tendency of the side plates to spread under bulging forces received from the top of side post.

New design steel end features deep corrugations running continuously from side to side, to transfer the forces from shifting loads to the sideframes. The corner post was previously a W section riveted to the end and to the side. The new design corner post is made as a welded triangular box section for additional strength, and is arc welded to the end. Rivets are used to attach the end to the car. This is done because it is necessary to use the rivets to pull the various parts of the car together in assembly, and a welding jig for this purpose is impractical because of its size.

Spot Welded Sheets—Door sheets are attached to an arc welded frame by spot welding. Each door sheet has a corrugation pressed into it to brace the sheet against bulging loads. These corrugations are arc welded to the frame of the door. Previous doors have been all riveted.

Each box car frame has many splices and joints, adding up to about 1000 feet. New welded box car, less the door, has about 85 per cent of these arc welded and 15 per cent riveted, since railroads require that certain connections be riveted for maintenance purposes.

Method of Manufacture—Most important item in economical production of a welded car is the preparation of fixtures, jigs and welding machines in which the work can be done with the minimum of delay and with the very best workmanship. It is necessary to prepare each part so that it is completely interchangeable with others of its kind, and, together with other prefabricated parts, will fit together as a whole, accurate as to dimension.

Building of the underframe begins with the fabrication and subassembly of the several individual sections which comprise the structure. Front and rear draft lugs together with their backing ribs are located and manually welded to each end of a center sill section on a unique apparatus. This simple positioning fixture is actually an inclined ramp which has been provided with stops that position the work for downhand welding in progressive stages by gravity. Two half sills are then welded together on a clamping fixture which automatically cambers the sill so it will be straight when finished.

Positioning Fixture — Strikers, coupler carriers, draft key slot reinforcements, and the center filler weldments are incorporated into the center sill section at a second ramp type of positioning fixture. Four stops are used on the incline to bring the sill into proper position for downhand welding from each side of the section.

Body bolster is fabricated in two separate steps. Die-blanked web plates are positioned on the bottom cover plate and full length high penetration welds are made to attach them. The "hairpin" backing plate for the side bearing is then positioned and welded both to web plates and to the bottom cover plate.

Bolster Assembly—A similar positioning fixture holds two sections of the preceding fabrication in proper position on the top cover plate to form the full length bolster assembly. Fig. 1, shows a completed body bolster assembled into the underframe.

Crossbearer fabrications and subassembly is, in procedure, very similar to the bolster construction. However, inasmuch as none of the members of this structure carry through or around the center sill, only a half length is made in subassembly. Also, the simpler detail of its construction permits the use of a single welding fixture to position both the top and bottom cover plates on the web. Shown in Fig. 2, is the completed crossbearer assembled in an underframe.

Downhand Welding—Center filler weldment is fabricated on a manually controlled positioning device designed to properly locate the work for downhand welding. A swivel mounted base plate with centering pin and suitable clamps holds the base plate, king pin spider, and web separator plates in their correct positions. The striker and coupler carrier are fabricated in a similar manner.

Assembly of the transverse members of the underframe, i.e., bolsters, crossbearers, crossties and end sills,

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with the completed centersill section is done in the underframe jig. This is an air actuated fixture that positions and clamps these members in correct position in the overall structure. Fig. 3, shows this jig with these subassemblies in place.

The parts are tack-welded to hold the assembly together after removal from the jig. The welding of the many connections in the underframe structure is performed in a turnover jig. Temporary trunnions attached to the ends of the center sill section permit the complete underframe to be rotated through 360 degrees. Paralleling the construction of the underframe are the fabrication and assembly of the principal sections of the car's superstructure.

Air Clamping—Complete car sideframe is assembled and welded in one fixture. Air actuated clamps hold the side sheets in correct position on the side plate, side sill, and post sections. Joint between the sheets and the side post is made with twin welding heads. Sheet is attached at the top and bottom of the side by machine made fillets.

Roof is assembled in a similar manner. Car and sheets are riveted in subassembly at the horizontal splice between upper and lower sheets. Riveting is employed because the pressed sheets are too wavy to arcweld correctly. Corner post sections which are already subassembled are positioned and welded to the inner flanges of the end sheet corrugations.

Final Assembly—Assembly of the car structure proper takes place in a typical assembly line setup. The completed underframe assembly is mounted on its trucks at the start of the line, and erection of side, end, and roof assemblies follow in successive order. Riveted connections to the underframe between sides and ends, and between roof and ends, are then fitted, reamed and driven, permitting the large subassemblies of the car to be pulled together without the use of large fixtures.

Welding of the roof sheets to the side plate sections is a manual operation. Side doors are hung and adjusted at the next position on the track. This completes the structural assembly of the car. Painting, installations of floor planking and side and end linings, and the application of specialties, then follow in order.

From a prize winning paper, James F. Lincoln Arc Welding Foundation contest.

Corrosion Proof Parts

(Continued from Page 87)

a drop or two of mild acid.

An alternate method of checking this film is to take a piece of work and wipe it absolutely clean with a rag. Take this wiped clean piece, dip it in the rinse water, and if it dries with a film you may feel pretty sure that this film formed in the rinse. Correction of rinse water films may be made by the addition of a lime solublizing agent to the rinse.

Some films are left because the cleaning solution is not thoroughly rinsed; these films are generally dried on unrinsed cleaning material. They are visible and often have the same color as cleaning material used. While they are also removed by the acid test, they will not, of course, form when the alternate test is given.

Another method of testing is to take the work and put it back for longer periods of time in hot water; the unrinsed cleaner film will be soluble. This condition is remedied by increasing the rinse time, improving flow of the rinse, increasing temperature of the rinse, increasing agitation in the rinse and other simple expedients.

In a number of cases, oxide films cause difficulty and the cleaner is generally blamed for incomplete cleaning. Oxide films are visible or sometimes show up as a water break in the rinse and they are not removed by stronger cleaning materials, longer cleaning, solvent cleaning or any of the quick tests suggested above.

Dipping a sample in strong acid, followed by a rinse, alkaline cleaning and rinse, should provide a surface with no water break. Different acids may be tried depending upon the metal reacting to form the oxide film. The remedy, of course, is to change the procedure so an acid dip of proper strength comes after the cleaning procedure. Oxide films are not always visible, as is the case where work is heat treated. Light oxide films will often cause difficulty and they may be formed by lengthy exposure of the metal to the atmosphere.

Once a cleaning procedure has been satisfactorily established, it is necessary to rustproof the product as quickly as possible to avoid rust formation. This will occur rapidly since the surface is chemically clean. Where possible, treat the metal while still warm and before moisture has had an opportunity to collect on the surface.

Rust Preventives—Selecting a proper rust preventive coating also depends upon many factors. Most important of these are the conditions under which the part is to be stored or shipped and the duration of time for which protection is desired. Handling properties, that is, the method of application, and drying properties also influence the selection. While many protective coatings have overlapping applications, the matter of a product's adaptability to individual plant conditions is often the deciding factor.

Rust preventives fall into four broad classifications: (1) Grease or petrolatum type, (2) solvent type, (3) oil type and (4) plastic type.

Grease Type—For the most part, grease type compounds are applied in a dipping operation being maintained in a control tank at temperatures ranging from 160 to 200° F. Grease type compounds vary in consistency from a firm wax to those having the consistency of vaseline. The latter types are particularly applicable to bearings, axles, transmissions, shackle bolts and other parts since they are most easily removed and if not, will disperse readily into any lubricant subsequently used. The harder grease compounds provide excellent protection for both indoor and outdoor storage.

Melting temperature should be considered in selecting a grease type product because in some localities the temperature during storage or shipping may exceed the melting point of the softer compounds. When parts in process are suspended from an overhead conveyor moving at a constant rate, it is not always practical to use the hot dip coating. It has been found that when parts of different masses are dipped, the larger mass will, of course, absorb heat more slowly, giving rise to the formation of a very heavy coat, unless the conveyor speed is reduced.

Grease type materials may be heated and applied by brush if desired or may be sprayed in heated guns. Brush application is advantageous where there is a limited amount of bright metal surface such as on large machines for which dipping would not be practical.

Solvent Type—Solvent types are by far the most widely used rust preventives. As the name implies, these products contain varying amounts of solvent vehicle, depending upon the job for which they were designed. These compounds are usually low viscosity liquids at room temperature, thus enabling application by either dipping, spraying or brushing.

Nature of the coatings produced varies considerably and may be wax-

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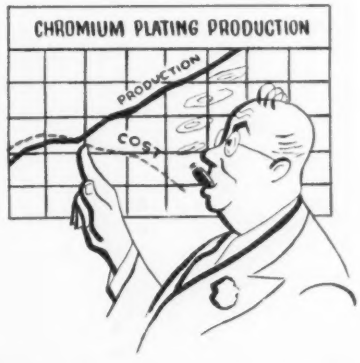

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like, oily, varnish-like or combinations of these. As is indicated these products require no controlled heating apparatus for application and will produce a uniform coating upon the part regardless of its size. For most applications, wax-like coatings are preferred, although they are somewhat more difficult to remove. A wax type coating will cling tightly to the metal. It is not easily brushed off nor does it have a tendency to drain away when subjected to high weather temperatures.

These coatings vary from a black opaque material which will withstand severe weather exposure, to the very light oily type coatings designed for limited exposure of 2 to 3 weeks. Between these two solvent type products are a wide range of coatings of varying thicknesses and affording various degrees of protection. Of particular interest and of versatile performance is the solvent type specialty numbers such as combination fingerprint removers and rust preventives. These products are widely used, not only as their name implies, to eliminate organic residues which initiate corrosion, but owing to their excellent water displacing properties, are ideal for removing corrosive coolant following machining or for removing water following cleaning processes.

Oil Types—Oil type coatings are desirable for relatively short periods of storage where the metal is not exposed to weathering. Oil type coatings are used on various parts, such as sleeves, pistons and rods, and sheet steel and wire. Subsequent handling of sheet steel in stamping or drawing operations is not impaired by the thin oil coating. Oil type coatings are more widely used for the protection of the interior of internal combustion motors. Certain of these products have not only superior rust proofing characteristics but are excellent lubricants as well, thus serving as break-in oils for both automotive and aeronautical engines.

Since oil type coatings blend readily with other lubricants, there is generally no necessity of removing them. They therefore find application to the interior of pumps, gear housings, transmissions, differentials, fuel tanks and carburetors and as a flush for lubricating, hydraulic, and cooling systems. Disadvantages of oil type coatings, which are easily applied, is the draining away of the coating during storage and when subjected to hot weather.

Plastic Types—Products which are limited in their use because of cost are those plastics which are basically either ethyl cellulose or cellulose acetate butyrate. Plastic type products are applied in a dipping operation at temperatures of around 350-380° F. They form a tough and usually transparent sheath about the part or tool and offer not only protection from corrosion but cushion the part against abrasion as well.

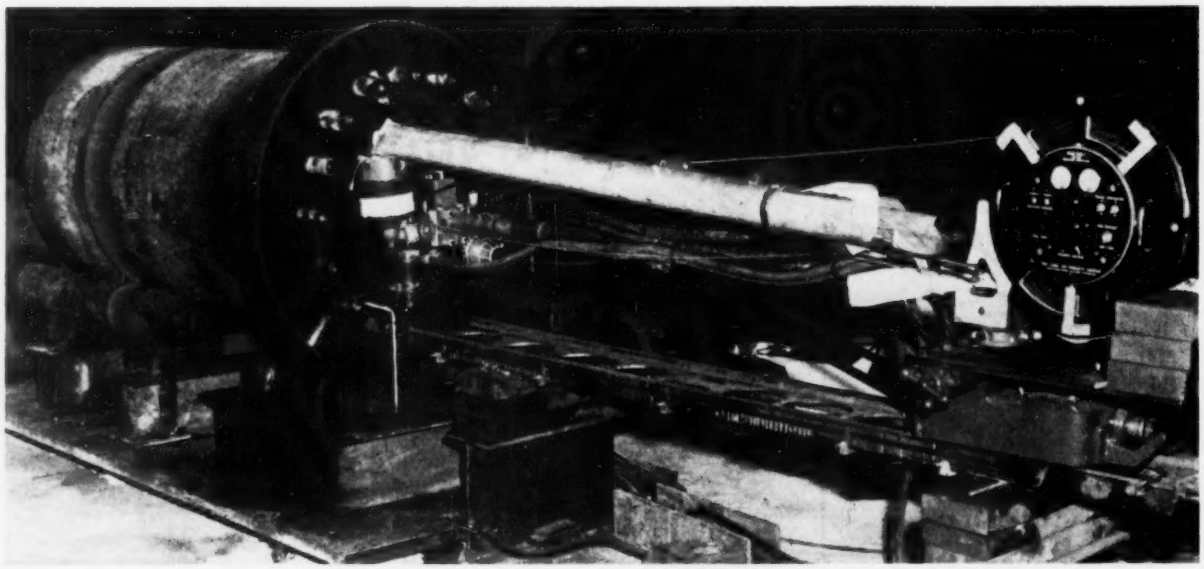
Plastic coatings are indeed a packaging and rust proofing operation in one. Widest use for this type is with the manufacturers of quality cutting tools and drills. At the end of the storage period or whenever the tool is to be used, the coating may be readily peeled from the part. A thin, oily residue exuded next to the metal facilitates removal of the coating.

Of special interest at this time are certain new chemically-treated wrapping papers which have the remarkable properties of neutralizing corrosive tendency of moisture in the package. It is expected that these papers may revolutionize packaging of steel.

From data presented at the packaging and materials handling course conducted jointly by the Industrial Packaging Engineers Association and University of Illinois, Extension Div. Chicago, Oct. 4-7, 1948.

—o—

Compilation of information from users of the automatic welding processes is represented in the 17-page booklet, "Survey of Automatic Arc and Gas Welding Processes as Used in the Automotive Industry," published by American Welding Society, New York, for 30 cents. Included are submerged arc, atomic hydrogen, shielded metal-arc, bare metal-arc, carbon-arc, inert-gas metal arc and oxy-acetylene welding. Factors for each process such as fit-up, current, backing, edge preparation and speed of welding are covered.



ECONOMICAL REPAIR: In rebuilding the bore of this 1000-ton hydraulic press cylinder, Unionmelt welding process was used to deposit some 915 pounds of steel rod in three layers, producing a total thickness of ⅞-inch. Cylinder which was 24 inches inside diameter by 15 feet long, was laid on turning rolls driven through a reduction gear by a variable speed motor which rotated it at a speed of 8 to 10 inches per minute. Total cost of installation, auxiliary equipment, materials and labor was approximately one-fourth that of new cylinder. Photo courtesy Linde Air Products Co., New York

Chrome-Nickel Steels

(*Concluded from Page 83*)

required to evaluate the mechanical properties of these steels. These indices are: Yield stress, first ultimate stress, stress at a reversal in the load-extension curve, stress at a minimum in the load-extension curve, second ultimate stress, and the true fracture stress.

Hardening and strengthening 18:8 steels at low temperatures depend greatly upon the amount of prior plastic deformation (cold working) the steel had received at room temperature. Increase in strength is greatest for the annealed steel and falls off with increase in the amount of prior plastic deformation at room temperature.

Metastable austenitic steels have good ductility. Even at temperatures as low as that of liquid air the ductility, as determined by reduction of area, is about as great as at room temperature. In this respect they are similar to nonferrous metals having a face-centered cubic structure, which retain good ductility at low temperatures. Ductility of the metastable austenitic steels previously subjected to plastic deformation is affected less by temperature than that of annealed steels since the amount of austenite transforming to ferrite in the tests at low temperature is less.

For the ferritic precipitation-hardening 18:8 steel, ductility decreases rapidly with decrease in temperature. At liquid-air temperature the steel is brittle. This 18:8 steel is similar therefore to the other ferritic steels, which lose ductility at low temperature and generally become brittle in tension tests at liquid-air temperatures.

Abrasive Wheel Molds Wearproofed with Carbide

Life of molds such as are used for forming abrasive wheels has been increased by as much as 10 times through the use of a lining of Carboloy cemented carbide, according to Carboloy Co., Detroit. In addition, it has been found that the molded wheels are more easily removed from the molds, due to the ability of carbide metal to retain its high finish for longer periods.

No alterations in the mold design, or in top and bottom plunger parts, were required to change them over to the carbide lining. Molds of this type are used to make the smaller sizes of mounted abrasive wheels and the points used on small, high speed grinding machines.

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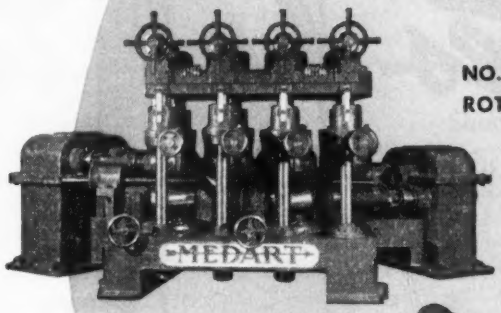

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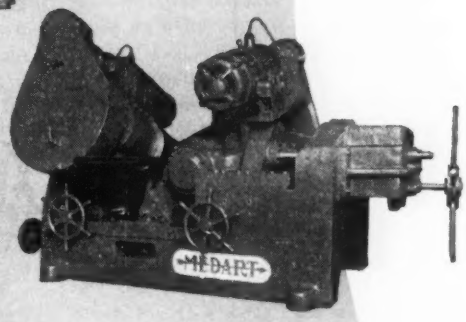

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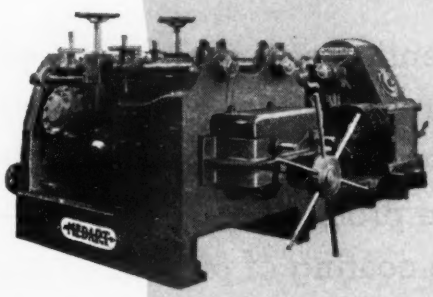

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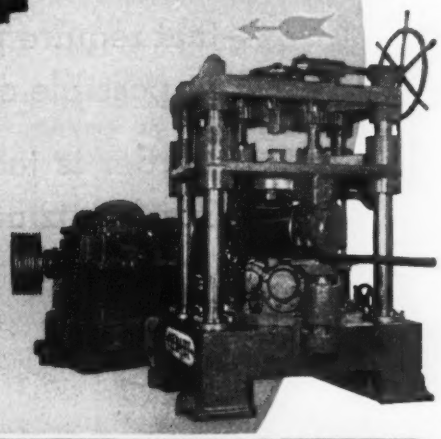

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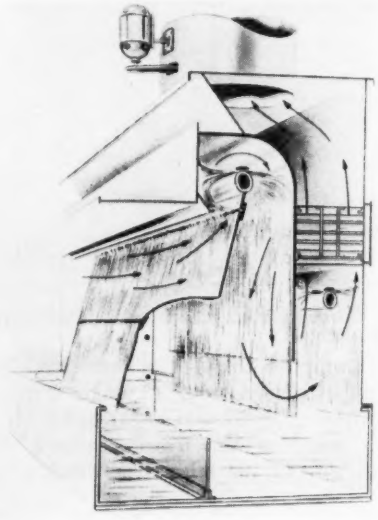

for disposal or reclamation. No paint reaches the exhaust fan blades and atmospheric pollution is reduced to a minimum. Water is recirculated, it being necessary to add only enough to offset evaporation.

Exhaust air passes through moisture eliminator plates before it reaches the exhaust stack. Units are made in a large number of stock sizes for ready erection. In industries where finishing is done simultaneously from both sides of the work, water wash installations are equipped with downdraft or tunnel exhaust.

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Die Casting Machine

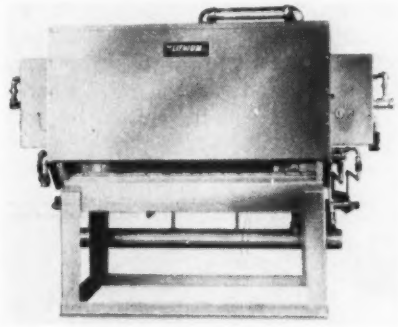
Feature of the unit die casting machine announced by B & T Engineering Co., Detroit, Mich., is an arrangement of machine plates whereby the fixed plate and traveling plate are adapted to directly receive die inserts in their butting faces. Thus four unit dies, each of which is a complete die 8 inches in diameter becomes an integral part of the machine plates. With the unit die incorporated in the machine (right), cost of building a complete separate die is eliminated.

Any one of the four unit dies may be removed at any time and production continues with the remaining three. Cooling is rapid and ejection automatic. Two of the units are arranged for side core pulls and may be cam, hand or hydraulically operated. Dies are mounted flush with the machine plate in an accurately jig bored recess. The four toggles of the machine exert a 450 ton locking pressure. Rated at 500 shots per hour, the machine displaces from 3 pounds of metal per shot under 4000 pounds pressure to 16 pounds of metal under 1000 pounds pressure.

Check No. 2 on Reply Card for more Details

Forge Furnace

Forgings may be heated free of scale with the direct fired lithium atmosphere forge furnace developed by Lithium Co., 111 Sylvan Ave., Newark 4, N. J. A suitable carrier gas from a gas generator is passed through a vaporizer tube where it mixes with



the vaporized lithium coming from the lithium vaporizing chamber. The gas mixture is then introduced into the work chamber where it provides the necessary protective atmosphere at the work. The slight coating of lithium imparted to the metal surface insures against scaling while the metal is being removed from furnace.

Furnace is constructed of heavy steel shell with a thick wall of refractory and insulating material. It is direct fired, using gas, oil or oil and gas in combination. Built for heavy constant duty, they are offered in standard single and double slot and continuous types.

Check No. 3 on Reply Card for more Details

Shear Stand

Of the tripod type, the all-steel shear stand, made by Beverly Shear Mfg. Co., Chicago, Ill., is designed to answer the need for a rigid, lightweight support for Beverly throatless and slitting shears. It is also adaptable to other types of machines and tools. Legs, as well as bracing members, are tubular and have holes for any method of anchoring the stand.

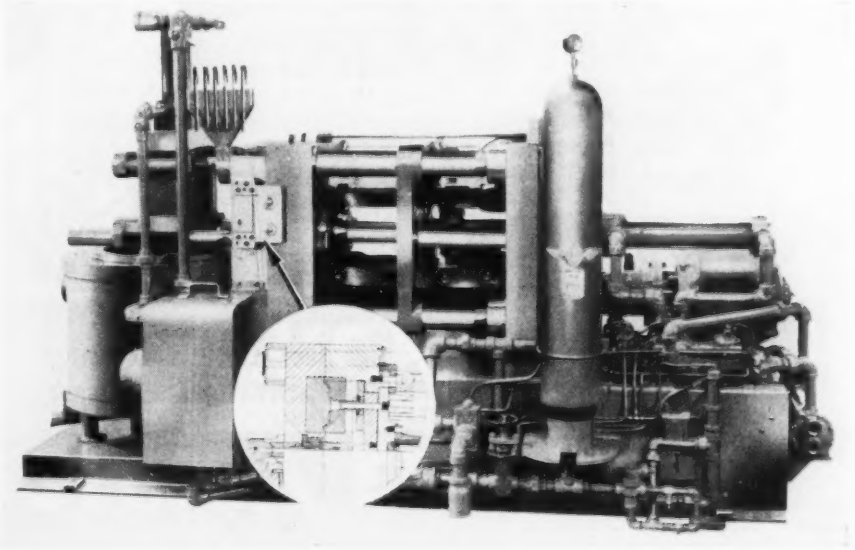
Top mounting plate is of heavy gage steel and measured 7 x 11 inches. Stand is furnished with mounting plate drilled to accommodate shears made by the company, but blank tops may be specified. It weighs 25 pounds.

Check No. 4 on Reply Card for more Details

Scale Dial Attachment

Howe Scale Co., Rutland, Vt., is announcing a tape-drive cabinet dial, an attachment for floor, industrial built-in, motor truck, tank and all types of overhead track and suspension scales. It is a wide-range weighing instrument, meeting the requirements of heavy, medium and light duty industrial weighing.

The tape-drive is a positive drive mechanism, using high strength, non-



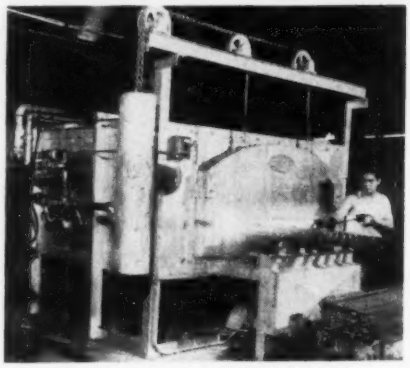
corrosive special alloy tapes to replace the style rack and pinion. It delivers a smooth drive to the pointer and requires minimum maintenance and service. An adjustable self-compensating hydraulic dash-pot using a valve type plunger working in "zero-flow" oil controls the pointer action and prevents shocks from reaching the mechanism. A multiple drop-weight system of weight addition makes it possible to quickly change the scale's capacity.

Check No. 5 on Reply Card for more Details

Annealing Furnace

Designed for the heating of spring leaves prior to forming, an annealing furnace built by Bellevue Industrial Furnace Co., 2971 Bellevue Ave., Detroit 7, Mich. has a maximum production rate of 3600 pounds per hour. The furnace conveyor mechanism consists of a series of four stationary alloy rails running the full length which support the leaves as they are moved through the furnace and three pusher type walking beam alloy rails. The movable rails are driven by a combination mechanical and hydraulic drive.

On the top of the walking beam rails are a series of fingers that push the springs forward approximately 2½ inches at a time, lowering and returning and coming up between the



next leaves. At the discharge end there is a door on each side where the work is removed and placed in the quenching fixture.

Check No. 6 on Reply Card for more Details

Wire Straightener Unit

A wire control and straightener unit, type 2W, announced by Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y., is adjustable to accommodate any coil size. It will handle 3/16-inch wire easily and efficiently. An outer metal hoop keeps the coil on the reel and prevents the wire from "riding off", or getting tangled under the arms.

Ball type thrust bearings make it free-running and eliminate all unnecessary drag from the reel top. All adjustable parts are equipped with thumb screws. An easy-to-reach brake adjusts reel top tension. The unit is easily adapted to mounting on automatic set-ups, bench or other desired place. Wire moves on sealed, grease-packed, ball bearing rollers.

Check No. 7 on Reply Card for more Details

Milling Attachment

Universal milling attachment made for installation on any small milling machine by United States Machine Tool Co., Cincinnati, O., is of rugged construction and is easily installed. It is equipped with two heavy duty steel driving gears and a large idler gear to take the heaviest cuts with the capacity of the milling machine itself. Cutter and drive arbors are mounted on Timken tapered roller bearings.

Entire mechanism is tightly sealed and equipped with a single grease nipple. Attachment is furnished with an arbor of the taper required for the milling machine with which it is

ACCEPTED

BY AMERICA'S LARGEST INDUSTRIAL PLANTS TO DO THE TOUGHEST BLASTING AND PEENING OPERATIONS

HI-GRADE METALLIC

FAMOUS

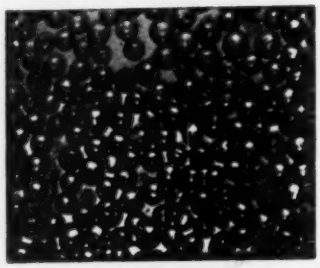
FOR ITS ABILITY TO STAND UP UNDER REPEATED HARD USE

SHOT

- ROUND
- UNIFORM IN SIZE
- UNIFORM IN HARDNESS
- LACKS IRREGULAR SHAPES

GRIT

- RECTANGULAR
- SHARP
- TOUGH
- DURABLE



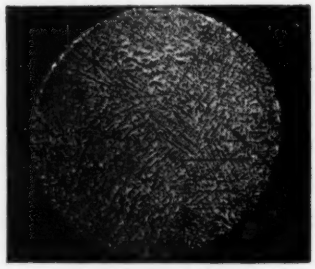
UNRETOUCHED PHOTO OF HI-GRADE SHOT

CLAYTON-SHERMAN ABRASIVES COMPANY

3896 LONYO ROAD

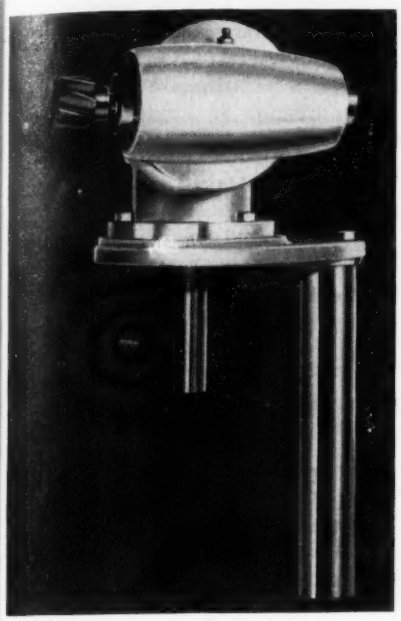
DETROIT 10, MICHIGAN

CEdar 7200



MICROSCOPIC STRUCTURE OF METAL

to be used. It is driven by the machine spindle at the same speed as the spindle itself. Equipped with a No. 7 B & S taper spindle, the attachment



can be used for milling, drilling or boring at any angle in any plant. A spring collet is available for adapting it to a wide range of tools.

Check No. 8 on Reply Card for more Details

Temperature Controls

The Xactline-Capacitrol and the Xactline-Capacilog instruments for indicating and recording temperature control, made by Claud S. Gordon Co., 3000 South Wallace St., Chicago 16, Ill., combine conventional pyrometer control features with auxiliary devices for maintaining "straight line" temperature control. Each combines the Wheelco electronic control principle and the "anticipating" feature of the Xactline control unit.

Application may be to any electrically heated or fuel fired oven or furnace equipped with motor operated or solenoid valve. Over and under shooting of temperature are eliminated. Only adjustment necessary is to select desired temperature control point.

Check No. 9 on Reply Card for more Details

Atmosphere Indicator

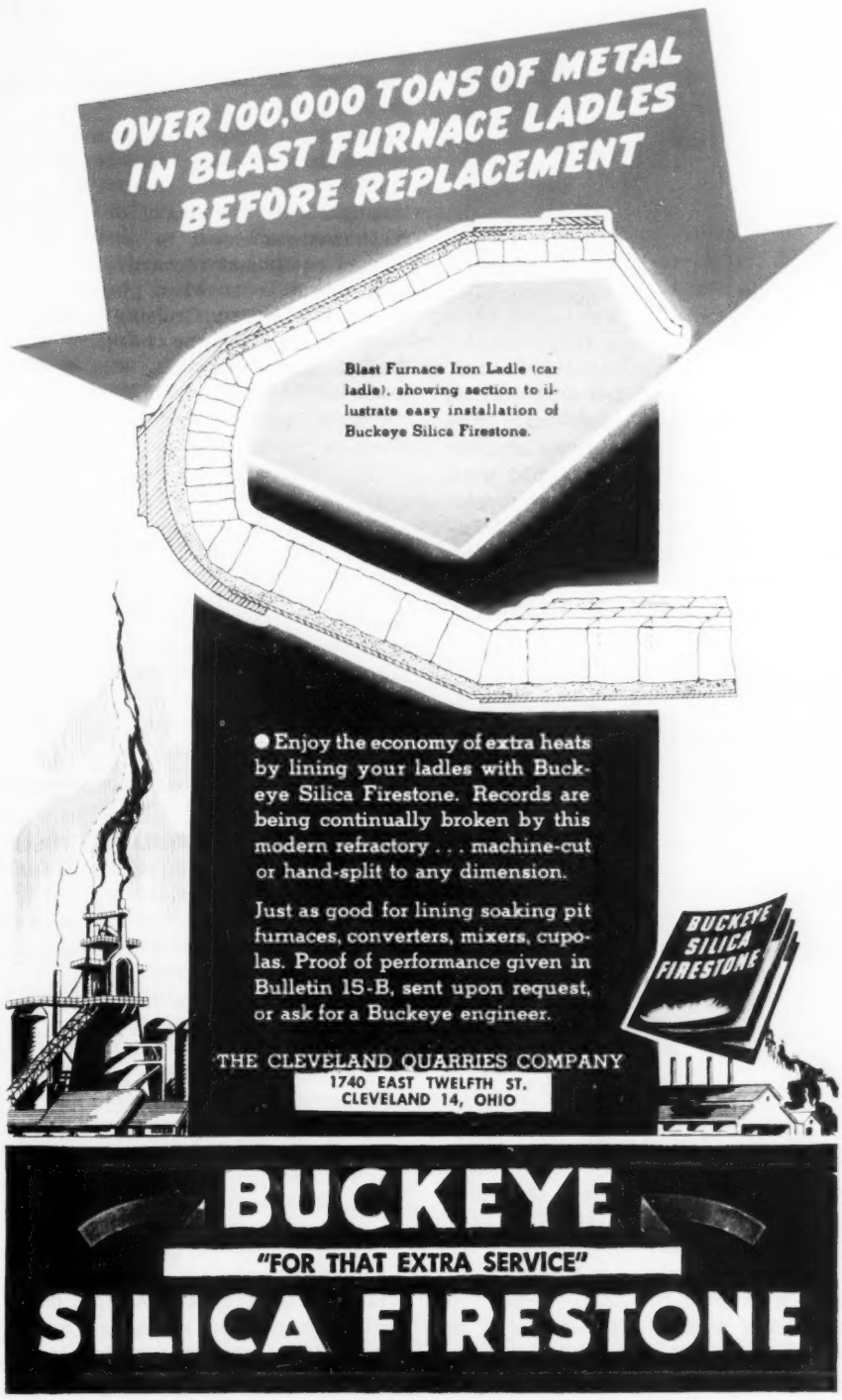
Relative oxidizing or reducing conditions of the atmosphere within a furnace, metal heat treating oven, etc., may be indicated with an atmosphere indicator developed by Charles Engelhard Inc., 850 Passaic Ave., East Newark, N. J. Gases are continuously analyzed in such a way that a complete record or indication of the furnace condition during an entire run is furnished automatically on a suitable electrical indicator or recorder. Each gaseous component of combustion contributes to the final reading approximately proportionate to its relative oxidizing or reducing effect.

Instrument requires no adjustments after it is put into use. Normal furnace controls are operated in the usual manner. The operator is guided by the furnace atmosphere indicator in setting the furnace controls. Direction of atmosphere change is indicated. Operation is from a 115 volt, 60 cycle power source.

Check No. 10 on Reply Card for more Details

Carbide Tool Grinder

Equipped for wet grinding, the new carbide tool grinder announced by United States Diamond Wheel Co., 704 Illinois Ave., Aurora, Ill., features small diameter wheels and accommodates tools having up to 1 inch shanks. Its grinding spindle is built to run smoothly at 9000 revolutions


OVER 100,000 TONS OF METAL IN BLAST FURNACE LADLES BEFORE REPLACEMENT
Blast Furnace Iron Ladle (car ladle), showing section to illustrate easy installation of Buckeye Silica Firestone.
● Enjoy the economy of extra heats by lining your ladles with Buckeye Silica Firestone. Records are being continually broken by this modern refractory . . . machine-cut or hand-split to any dimension.
Just as good for lining soaking pit furnaces, converters, mixers, cupolas. Proof of performance given in Bulletin 15-B, sent upon request, or ask for a Buckeye engineer.
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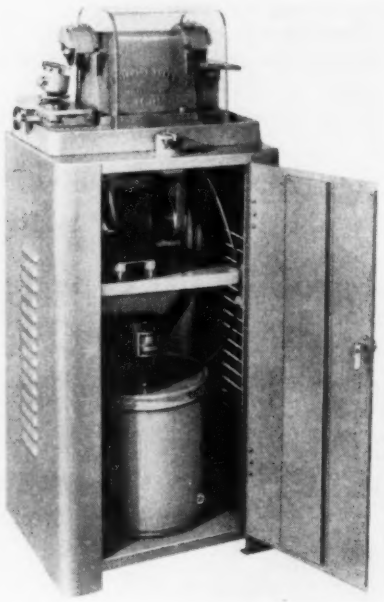
1740 EAST TWELFTH ST.
CLEVELAND 14, OHIO
BUCKEYE SILICA FIRESTONE
BUCKEYE
"FOR THAT EXTRA SERVICE"
SILICA FIRESTONE

per minute, giving a higher surface speed to the small wheels for faster cutting. Spindle is mounted in a removable cartridge type ball bearing unit.

Diamond wheel has a full 3/4-inch wide grinding surface for off-hand

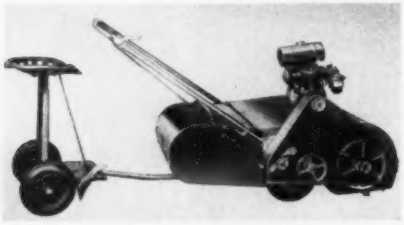


grinding. It is plated at a convenient operator height. An all-angle vise gives quick set-ups for chip breaker grinding. Grinder is equipped with cabinet, 1/3-horsepower motor, coolant pump, wheel guards and two diamond wheels. Height to spindle is 46 inches.

Check No. 11 on Reply Card for more Details

Power Sweeper

Power sweepers which keep floors free of welding rod butts, nails, chips, paper and dirt are now offered with a sulky towing dolly, according to Wilshire Power Sweeper Co., 4615



Alger St., Los Angeles 26, Calif. The sulky, which enables the operator to ride while sweeping, is of steel construction and is equipped with rubber tired zero-pressure air wheels.

Sweeper has either a 2 or 3 horsepower air cooled gasoline engine and is offered with a sweep width of 20 to 36 inches. It is available with or without traction power drive. Sulky has its own brake, is easily maneuverable and with the sweeper has a turning radius of only 90 to 125 inches.

Check No. 12 on Reply Card for more Details

Intraplant Car

Developed by Beall Mfg. Co., Cleveland, O., is the Widgit Electro-Car, a one-man vehicle for transportation in factories, warehouses, etc. It can be started, steered and stopped with one hand. Grip type handle is turned clockwise to start and accelerate through two other speeds up to 15 miles per hour. To stop, handle is turned back and pressed downward to apply the aircraft hydraulic brake. Drive in reverse is by turning the tiller bar 180 degrees and operating as before.

Car has a welded steel frame, front wheel drive, a low center of gravity and full pneumatic tires. Power is furnished by two heavy duty 6-volt batteries connected in series. Furnished equipment recharges the batteries in 8 hours when plugged into a 110-volt outlet. Cruising range is about 20 miles on one charge. A wire basket for tools, mail,, etc., a bell and a headlight are optional.

Check No. 13 on Reply Card for more Details

• • •

EXTREME PRESSURE LUBRICANT: Molykote, a new type dry lubricant, consists essentially of molybdenum disulphide powder and has the appearance of graphite. With light rubbing it adheres to smooth surfaces and has a low friction coefficient. It is available from Alpha Corp., Greenwich, Conn.

Check No. 14 on Reply Card for more Details

CURRENT TRANSFORMER: Based on a new principle in current-transformer design, error-causing effects of stray magnetic fields from the same or other circuits are completely eliminated in the current transformer offered by Westinghouse Electric Corp., Pittsburgh, Pa. It has an accuracy of plus or minus one-tenth of 1 per cent and 5 minutes phase angle over range of current from 10 to 150 per cent at burdens up to 0.5 ohms. The transformer has eight current ratings from 1000 through 4000 amperes to 5 amperes.

Check No. 15 on Reply Card for more Details

TIME DELAY UNIT: A time delay unit with settings available from 1 second to 2 minutes duration is offered by DiaPHlex division, Cook Electric Co., Chicago 11, Ill. Designated as Tarrytron, its heater currents can be ranged from 6 to 115 volts, alternating or direct current. It is furnished with an octal plug-in base, interchangeable with similar time delays.

Check No. 16 on Reply Card for more Details

COLD SOLDER: Alvin Products Inc., Worcester 4, Mass., announces Lab-Metal, a cold solder that will fill blow holes, sand holes, surface blemishes and rough or porous places in metal castings. It is applied with a putty knife and hardens quickly. It will not shrink or crack and is water and rust proof.

Check No. 17 on Reply Card for more Details

PNEUMATIC VISE: Airlox senior model S-200 pneumatic vise is designed to do production work holding on the 40 to 50 horsepower milling machines. It is manufactured by Production Devices Inc., Whitehall, N. Y.

Check No. 18 on Reply Card for more Details

TRACTOR WINCH: Tractowinch is a single drum unit with a maximum capacity of 7500 pounds single line pull on the first layer of cable. Features of the winch, made by American Hoist & Derrick Co., St. Paul, Minn., include fairlead rollers which allow a sharp offlead of the cable to either side and permit easy moving of material in tight spots, also a hand operated contracting band brake. A drawbar built into the winch frame allows the tractor to perform regular towing jobs without removing winch.

Check No. 19 on Reply Card for more Details

MAGNETIC CHUCK: Model HR-510-C, offered by Hanchett Magna-Lock Corp., Big Rapids, Mich., is a new magnetic chuck particularly suited for use on small machines and for bench work. It has a working surface 5 x 10 inches and is 4 inches high. It is furnished complete with separate rectifier and built-in switch.

Check No. 20 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

PROSPECTS— Undercurrent continues strong in the steel market despite seasonal influences and spottiness in consumer goods, principally household appliances. Production cutbacks in certain manufacturing lines, accompanied by some curtailment of labor forces has not yet been reflected in a slackening in steel demand. Producers, however, are alerted for any change in conditions which may develop, cognizant of the fact that a change could develop quickly as it has at times in the past. Industrial purchasers are exercising more caution in ordering for inventory but this has not affected steel demand except in the gray market where increasing resistance to the high prices quoted is reported.

DEMAND— Most producing mills will enter the new year with substantial tonnage arrearages in all major lines of steel products, and expectations are consuming requirements will continue well in excess of supplies for some months to come. So far, whatever slack in demand has developed from one direction has been quickly taken up from another. For that matter, however, even those manufacturers who have curtailed operations have not cut back their steel requirements, evidently seeking to build up inventories. Particular stringency is indicated in sheets, strip, pipe and plates through the first half of 1949 at least, with the situation in bars, shapes and certain wire items only slightly less acute.

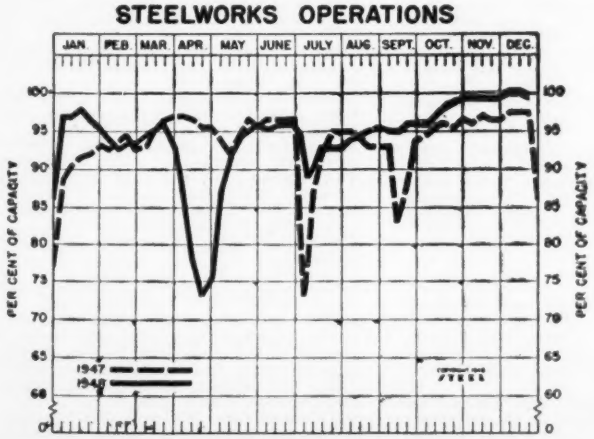
QUOTAS— Consumers are still uncertain as to how much tonnage they can expect to receive during first quarter. While most producers have set up quotas for the period, these, for the most part, are tentative, and in many instances are on a monthly basis only. In some cases tonnage has been allotted only through January, and in some others through February. In sheets, for example, the great proportion of hot and cold-rolled tonnage has not been allotted beyond February, except for priority work. In the East a particularly severe pinch in carbon bars appears in prospect with district consumers reporting inability of local area producers to fill the supply gaps resulting from withdrawal of Pittsburgh and midwestern sellers from serving the territory.

ALLOCATIONS— Future of the voluntary allocation program is uncertain. Whether the present law will be extended beyond the Feb. 28 deadline, revised, or displaced by entirely new legislation is a matter for increasing speculation. Recently the steel industry agreed to extension of voluntary allocations for certain essential industries and indicated willingness to continue as in the past year. Improving supply conditions in steel are serving to lessen somewhat the pressure for imposition of mandatory allocations. In fact, need for such next year appears increasingly questionable. Even the Commerce Department has revised downward its estimate of likely 1949 steel shortage from 10 million to 5 or 6 million tons. At the moment several proposed voluntary allocation programs are up for extension, and after these are disposed of it is expected nothing further will be done along this line pending action by the 81st Congress on Public Law 395 which authorizes voluntary action.

PRICES— The market is quiet with respect to prices. Several more producers have advanced contract tin plate quotations and one producer has advanced base prices and effected a change in its extra card on stainless steel products, including bars, hot and cold strip, and forging billets. Scrap is showing increasing signs of easiness, especially the foundry grades.

STEEL'S arithmetical price composites held unchanged last week and compared with those for the like 1947 week as follows: Finished steel, $95.50 and $76.09; semifinished steel, $75.75 and $57.20; steelmaking pig iron $46.29 and $36.31; steelmaking scrap, $43.25 and $39.92.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Dec. 18	Change	Same Week 1947	Same Week 1946
Pittsburgh	96	— 0.5	101.5	92
Chicago	98	— 1	94	86
Eastern Pa.	97	None	93.5	77
Youngstown	105	None	102	67
Wheeling	94.5	— 3	93.5	85
Cleveland	96.5	— 3	91	91.5
Buffalo	104	None	88.5	88.5
Birmingham	100	None	102	84
New England	89	None	85	90
Cincinnati	99	None	89	85
St. Louis	89.5	— 2	89.5	68
Detroit	100	None	94	93
Estimated national rate	99.5	— 0.5	97.5	85

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Dec. 18	Dec. 11	Month Ago Nov. 1948	Year Ago Dec. 1947	5 Years Ago Dec. 1943
Finished Steel	$95.50	$95.50	$95.16	$76.15	$56.73
Semifinished Steel	75.75	75.75	75.75	57.20	36.00
Steelmaking Pig Iron	46.29	46.29	46.29	36.31	23.00
Steelmaking Scrap	43.25	43.25	43.25	40.13	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Nov. 1948	4.14340c
Oct. 1948	4.16150c
Sept. 1948	4.13446c
Nov. 1947	3.47537c
Nov. 1943	2.39672c

***STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (re-rolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

†**FINISHED STEEL WEIGHTED COMPOSITE:** Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. November, 1948, figure is preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	Dec. 18, 1948	Nov. 1948	Sept. 1948	Dec. 1947
Steel bars, Pittsburgh mills	3.45c	3.45c	3.45c	2.90c
Steel bars, del. Philadelphia	3.79	3.79	3.79	3.318
Steel bars, Chicago mills	3.35	3.35	3.35	2.90
Shapes, Pittsburgh mills	3.275	3.275	3.275	2.80
Shapes, Chicago mills	3.25	3.25	3.25	2.80
Shapes, del. Philadelphia	3.48	3.48	3.48	2.954
Plates, Pittsburgh mills	3.50	3.50	3.50	2.95
Plates, Chicago mills	3.40	3.40	3.40	2.95
Plates, del. Philadelphia	3.71	3.71	3.71	3.17
Sheets, hot-rolled, Pittsburgh mills	3.275	3.275	3.275	2.80
Sheets, cold-rolled, Pittsburgh	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.40	3.90
Sheets, hot-rolled, Gary mills	3.25	3.25	3.25	2.80
Sheets, cold-rolled, Gary mills	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.40	3.90
Strip, hot-rolled, Pittsburgh mills	3.275	3.275	3.275	2.80
Strip, cold-rolled, Pittsburgh mills	4.375	4.375	4.375	3.55
Bright basic, wire, Pittsburgh	4.325	4.325	4.325	3.675
Wire nails, Pittsburgh mills	5.775	5.775	5.775	4.625
Tin plate, per base box, Pitts. dist.	$6.70	$6.80	$6.80	$5.75

Semifinished

Sheet bars, mill	$67.00*	$67.00*	$67.00*	$53.57
Slabs, Chicago	52.00	52.00	52.00	40.18
Rerolling billets, Pittsburgh	59.00	59.00	59.00	40.18
Wire rod 7/32 to ¼-inch, Pitts. dist.	3.775c	3.775c	3.775c	3.05c

* Nominal.

Pig Iron

	Dec. 18, 1948	Nov. 1948	Sept. 1948	Dec. 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$48.08	$37.913
Basic, Valley	46.00	46.00	46.00	36.00
Basic, eastern del. Philadelphia	50.17	50.17	47.77	38.84
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	47.58	37.413
No. 2 fdry., del. Philadelphia	50.67	50.67	48.27	39.34
No. 2 foundry, Chicago	46.25	46.25	43.25	36.00
No. 2 foundry, Valley	46.50	46.50	43.50	36.50
Southern No. 2 Birmingham	43.38	43.38	43.38	34.88
Southern No. 2 del. Cincinnati	49.09	49.09	49.09	37.74
Malleable, Valley	46.50	46.50	43.50	36.50
Malleable, Chicago	46.50	46.50	43.50	36.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	66.00	62.00	50.00
Ferromanganese, f.o.b. Etna, Pa.	163.00	163.00	148.00*	151.00*

* F.o.b. cars Pittsburgh.

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$42.75	$42.75	$42.75	$40.00
Heavy melt. steel, No. 2, E. Pa.	41.50	41.50	41.50	41.625
Heavy melt. steel, No. 1, Chicago	41.75	41.75	41.75	38.75
Heavy melt. steel, No. 1, Valley	42.75	42.75	42.75	39.75
Heavy melt. steel, No. 1, Cleveland	42.25	42.25	42.25	39.25
Heavy melt. steel, No. 1, Buffalo	48.50	48.50	48.15	42.50
Rails for rerolling, Chicago	69.50	69.50	64.50	58.625
No. 1 cast, Chicago	70.50	70.50	71.10	55.875

Coke

Connellsville, beehive furnace	$14.50	$14.50	$14.50	$12.25
Connellsville, beehive foundry	17.00	17.00	17.00	14.50
Chicago, oven foundry, ovens	20.40	20.40	20.40	17.875

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $100-$105 per gross ton. Forging quality, $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except $62, Conshohocken, Pa.; $66, Monessen, Pa.; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $68, Conshohocken, Pa., mill.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill except: $70, Conshohocken, Pa.

Sheet Bars: $67 nom., per net ton, mill; sales in open market $110-$115 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill; some sellers quoting up to $120 per gross ton.

Wire Rods: Basic and acid open-hearth, 7/32 & ⅜-inch, inclusive, 3.40c per lb, mill, except: 3.65c, Struthers, O.; 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Portsmouth, O., Los Angeles; 4.15c Monessen, Pa. One producer quotes 3.90c, Chicago base. Basic open-hearth and bessemer, not resulphurized, 7/82 to 47/64-inch, inclusive, 3.50c, mill.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in. (Base 20 tons one size): 3.35c, mill, except: 3.55c, Ecorse, Mich., Pittsburgh, Monessen, Aliquippa, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif., Portland, Oreg., Atlanta, Seattle; 4.20c, Kansas City, Mo.; 4.25c, Minnequa, Colo.; 5.30c, Fontana, Calif.

Rail Steel Bars: (Base 10 tons): 3.35c, Moline, Ill., 5.10c, Williamsport, Pa.; another interest quotes 5.35c, mill.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 5.50c, Fontana, Calif.

Hot-Rolled Alloy Bar Shapes: 4.00c, mill.

Cold-Finished Carbon Bars (Base 40,000 lb and over): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.25c, Monessen, Pa.; 4.30c, Ecorse, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.45c, Camden, N. J.; 5.30c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.75c, Monessen, Pa.; 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford.

High-Strength, Low-Alloy Bars: 5.10c, mill, except; 5.40c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 3.55c, Monessen, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, Atlanta, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.25c, mill, except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 4.65c, Williamsport, Pa., mill; another interest quotes 5.35c, mill.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa., 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.25-3.30c, Cleveland; 3.30c, Pittsburgh; 3.45c, Ecorse, Mich.; 3.95c, Pittsburg, Torrance, Calif.; 5.00c, Conshohocken, Pa.; 5.65c, Fontana, Calif.; 6.25c, Kansas City, Mo.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 4.65c, Niles, O., 5.05c, Torrance, Calif., Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Ecorse, Mich.; 4.70c, Granite City, Ill.; 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 5.00c, Niles, O.; 5.15c, Pittsburg, Torrance, Calif.; 5.30c, Kokomo, Ind.

Galvannealed Sheets: 4.95c, mill, except: 5.05c, Indiana Harbor, Ind.; 5.55c, Niles, O.; 5.70c, Kokomo, Ind.

Culvert sheets, No. 16 flat Copper Steel (based on 5-cent zinc): 5.00c, mill, except: 5.40c, Granite City, Ill.; 5.45c, Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except: 4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.; 6.00c, Niles, O.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill, except: 5.95c, Warren, O.; 6.05c, Niles, O.

Electrical: Hot-rolled, 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill. 6.45c, Warren, O.; 6.55c, Niles, O.

Motor: 6.70c, mill except: 6.90c, Granite City, Ill.; 7.20c, Warren, O.; 7.95c, Follansbee, W. Va., Toronto, O.; 9.20c, Brackenridge, Pa.

Dynamo: 7.50c, mill, except: 8.65c, Follansbee, W. Va., Toronto, O.; 7.70c, Granite City, Ill.; 10.00c, Brackenridge, Pa.

Transformer 72, 8.05c, mill, except: 9.15c, Follansbee, W. Va., Torronto, O.; 11.80c, Brackenridge, Pa. 65, 8.60c, mill, except: 9.85c, Follansbee, W. Va., Toronto, O.; 12.35c, Brackenridge, Pa.; 58, 9.30c, mill, except: 10.55c, Follansbee, W. Va., Toronto, O.; 13.05c, Brackenridge, Pa.; 52, 10.10c, mill, except: 11.35c, Follansbee, W. Va., Toronto, O.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., and Conshohocken, Pa., mills.

Galvanized (No. 10), 6.75c, mill.

Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh, Riverdale, Ill.; 3.25-3.35c,* Sharon, Pa.; 3.45c, Ecorse, Mich., Atlanta; 3.60c, Detroit; 3.70c, West Leechburg, Pa.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, S. San Francisco, Los Angeles; 4.20c, Kansas City, Mo.; 4.30c, Minnequa, Colo.; 5.00c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

* Wider than 6-in. and 6-in. and narrower, respectively.

Cold-Rolled Strip (0.25 carbon and less): 4.00c, mill, except 4.00-4.25c, Warren, O.; 4.00-4.50c, Youngstown; 4.20c, Ecorse, Mich.; 4.25c, Riverdale, Ill.; 4.40-4.50c, Detroit; 4.50c, New Haven, Conn., West Leechburg, New Castle, Pa., Boston; 4.75c, Dover, O., New Kensington, Pa.; 4.50-5.00c, Trenton, N. J.; 4.80-5.05c, Wallingford, Conn.; 5.75c, Los Angeles; 7.10c, Fontana, Calif. One company quotes 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base; another, 5.00c, Pittsburgh base.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.25c, Dover, O., Chicago; 4.30c, Worcester, Mass.; 4.50c, New Castle, Pa., Boston, Youngstown; 4.75c, Wallingford, Conn. Over 0.40 to 0.60 C, 5.50c, mill, except: 5.65c, Chicago; 5.75c, Dover, O.; 5.80c, Worcester, Mass., Wallingford, Conn., Trenton, N. J.; 5.95c, Boston; 6.00c, New Castle, Pa. Over 0.60 to 0.80 C, 6.10c, mill, except: 6.25c, Chicago; 6.35c, Dover, O.; 6.40c, Worcester, Mass., Wallingford, Bristol, Conn., Trenton, N. J.; 6.60c, New Castle, Pa. Over 0.80 to 1.05 C, 8.05c, mill, except: 7.85c, Dover, O.; 8.20c, Chicago; 8.35c, Worcester, Mass., Bristol, Conn., Trenton, N. J. Over 1.05 to 1.35 C, 10.35c, mill, except: 10.15c, Dover, O.; 10.30c, Wallingford, Conn.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton, N. J.

Cold-Rolled Alloy Strip: 9.50c, mill, except: 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich., mill.

Tin, Terne Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $6.60-$6.80; 1.50 lb coating $6.80-$7.00. Pittsburg, Calif., mill $7.35 and $7.55, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, $5.80-$6.00; 0.50 lb tin, $6.00-$6.20; 0.75 lb tin, $6.20-$6.40.

Can Making Black Plate: Per base box of 100 lb, 55 to 70 lb basis weight, $5.20-$5.30; 75 to 95 lb basis weight $5.10-$5.20; 100 to 128 lb basis weight $5.20-$5.30. $5.95, $5.85, $5.95, respectively, Pittsburg, Calif.

Holloware Enameling Black Plate: 29-gage, 4.75c per pound, except: 4.85c, Sparrows Point, Md.; 4.95c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $5.90, except: $6 Fairfield, Ala., Sparrows Point, Md.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C, 8-lb, $15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md., Johnstown, Pa., Lackawanna, N. Y.; 3.60c, Pittsburgh; 3.65c, Ecorse, Mich.; 3.75c., Coatesville, Pa.; 3.95c, Claymont, Del., Conshohocken, Pa.; 4.30c, Seattle, Minnequa, Colo.; 4.56c, Houston, Tex.; 5.80c, Fontana, Calif.; 6.50c, Harrisburg, Pa.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 5.10c, Coatsville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.10c, Coatesville, Pa.; 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.65c, Ecorse, Mich., Sharon, Pa.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Pa., Lackawanna, N. Y., Johnstown, Aliquippa, Pa.; 3.85c, Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, S. San Francisco, Los Angeles; 5.75c, Fontana, Calif.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill. except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Monessen, Pa., Minnequa, Colo., Atlanta, Buffalo; 4.70c, Portsmouth, O.; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, S. San Francisco; 5.40c, Shelton, Conn. One producer quotes 4.50c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.30c, Portsmouth, O.; 5.65c, Sparrows Point, Md., Monessen, Pa.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J.; 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md.; 4.95c, Monessen, Pa.; 5.10c, Worcester, Mass.; 5.15c, Minnequa, Colo., Kokomo, Ind.; 5.20c, Atlanta; 5.75c, S. San Francisco, Pittsburg, Calif. One producer quotes 5.15c, Chicago and Pittsburgh base; another, 5.20c. Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md.; 5.40c, Monessen, Pa.; 5.55c, Worcester, Mass.; 5.60c, Kokomo, Ind., Minnequa, Colo.; 5.65c, Atlanta; 6.20c, Pittsburg, S. San Francisco, Calif. One producer quotes 5.60c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Column 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind.; 109 Worcester, Mass.; 110 Minnequa, Colo., Atlanta; 117, Portsmouth, O.; 123, Pittsburg, Calif.; 124, Cleveland; 126, Monessen, Pa.; $6.75 per 100 pound keg, Conshohocken, Pa., Wheeling, W. Va. One producer quotes column 109, Chicago and Pittsburgh base; another, column 113, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Column 109, mill, except: 113, Monessen, Pa., Kokomo, Ind.; 116, Minnequa, Colo.; 121 Atlanta; 132, Pittsburg, Calif. One producer quotes column 113, Pittsburgh and Chicago base; another column 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Column 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind.; 126, Atlanta; 128, Monessen, Pa.; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, S. San Francisco. One producer quotes 127, Chicago and Pittsburgh base.

Fence Posts (with clamps): Column 114, Duluth; 115, Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo.; $123.50 per net ton, Williamsport, Pa.

Bale Ties (single loop): Column 106, mill, except: 108, Sparrows Point, Md., Kokomo, Ind.; 110, Atlanta; 113 Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes column 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Stainless Steels

(Mill prices, cents per pound)

CHROMIUM NICKEL STEELS

Type No.	Bars, Wire Shapes	Strip, Cold-Rolled	Sheets
301	28.50-28.75	30.50-32.00	37.50-40.75
302	28.50-28.75	33.00-33.75	37.50-40.75
303	31.00-31.50	36.50-39.75	39.50-43.00
304	30.00-31.25	35.00-35.75	39.50-43.00
316	46.00-48.00	55.00-57.25	53.00-57.25
347	38.50-39.75	48.50-50.25	50.00-54.00

STRAIGHT CHROMIUM STEELS

410	22.75-23.00	26.50-27.00	32.00-33.00
416	23.25-23.50	28.25-33.50	32.50-33.50
430	23.25-23.50	27.00-27.50	34.75-35.50
446	32.50-33.00	60.00-62.25	46.50-50.00

STAINLESS-CLAD STEELS

	Plates —Cladding— 10%	Plates —Cladding— 20%	Sheets —Cladding— 10%	Sheets —Cladding— 20%
302	....	....	19.75	21.50
304	22.50	26.50	20.75	22.50
310	32.50	36.50	....	....
316	27.00	31.00	26.00	28.00
321	23.50	27.50	....	....
347	25.00	29.00	24.00	26.00
405	18.75	24.75	....	....
410	18.25	24.25	....	....
430	18.25	24.25	....	....

TOOL STEELS

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.50c
18	4	3	...	...	114.50c
18	4	2	...	9	168.50c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

Tubular Goods

Standard Steel Pipe: Mill prices in carlots, threaded and coupled, to consumers about $200 a net ton.

In.	Butt Weld Blk.	Butt Weld Gal.	In.	Butt Weld Blk.	Butt Weld Gal.
⅛	39½–	10–	1	46–	26–
	41½	12½		48½	27
¼	37½–	11½–	1¼ ...	46½–	26½–
	39½	14		49	28
⅜	34–	6½–	1½ ...	47–	27–
	36	9		49½	28½
			2	47½–	27½–
½	40½–	19–		50	29
	43	21½	2½, 3..	48–	28–
¾	43½–	23–		50½	29½
	46	24½	3½ & 4	44½	22½

In.	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	39½	17½	38½	16½	27–	5–
					38½	17
2½ ..	42½–	20½–	41½	19½	32½–	10½–
	43½	22½			41½	20
3	42½–	20½–	41½	19½	35–	12–
	43½	22½			42½	21½
3½&4	42½–	21–	43½	21½	38½–	16½–
	46½	24½			43¼	22
5 & 6	42½	24½	43½	21½	38½–	16½–
	44½	22½			43½	22
7	....	....	....	....	43½	20½

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

In.	Butt Weld Blk.	Butt Weld Gal.	In.	Butt Weld Blk.	Butt Weld Gal.
⅛	40½	....	1¼ ...	46–	26–
				48	27
¼	38½	....			
⅜	35	....	1½ ...	46½–	26½–
				48½	27½
½	40–	18½–			
	42	19½	2	47–	26½–
¾	43–	22½–		49	28
	45	23	2½ & 3	47½–	27–
1	45½–	25½–		49½	28½
	47½	26	3½ & 4	43½	....

In.	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	38½	16½	37½	15½	26–	4–
					37½	16
2½ ..	42½	20½	40½	19½	31½–	9½–
					40½	19
3 ...	42½	20½	40½	19½	34–	12–
					40½	19
3½-4.	41½–	20–	42½	20½	37½–	15½–
	45½	23½			42½	21
5 & 6.	41½–	20	42½	20½	37½–	15½–
	43½				42½	21
8 ...	45½	....	44½	21½–	40½–	17½–
				22	44½	22
10 ..	45	....	44	21–	41½–	18½–
				21½	44	21½
12 ..	44	....	43	20	40½–	17½–
					43	20½

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

In.	Butt Weld Bulk	Butt Weld Gal.	In.	Lap Weld Bulk	Lap Weld Gal.
⅜ ...	+59½	+95½	1¼ ..	+22	+53
½ ...	+20½	+52½	1½ ..	+15½	+45½
¾ ...	+10½	+41½	2	+ 7½	+36½
1 and			2½-3½	+ 5	+32
1¼	+ 4½	+32½	4	List	+26
1½ ..	— 1½	+29	4½-8	+ 2	+27½
2	— 2	+28½	9-12.	+12	+37

Boiler Tubes: Net base c.l. prices, dollars per 100', mill; minimum wall thickness, cut lengths 4 to 24"; inclusive.

(Following prices on seamless boiler tubes raised 10% by Babcock & Wilcox Tube Co. as of Nov. 22.)

O.D. In.	B.W. Ga.	Seamless— Hot Rolled	Seamless— Cold Drawn	Elec. Weld— Hot Rolled	Elec. Weld— Cold Drawn
1	13	....	13.39	13.00	13.00
1¼	13	....	15.87	13.21	15.39
1½	13	$15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

Pipe Cast Iron: Class B, 6-in. and over, $93.50 per net ton, Birmingham; $106.70, del. Chicago; 4-in. pipe, $5 higher; Class A pipe, $5 a ton over Class B.

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb, mill, except: $3.50, Indiana Harbor, Ind.

Light (billet): $3.55 per 100 lb, mill, except: $4.25, Minnequa, Colo.

Light (rail steel): $5.10 per 100 lb, Williamsport, Pa.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb, mill. Untreated: $8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes: 5.35c, mill, except: 5.25c, Pittsburgh.

Axles: 5.20c, mill.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.39	50.89	51.39	51.89
Brooklyn, N. Y., del.	....	52.40	52.90	....
Philadelphia, del.	50.17	50.67	51.17	51.67
Birmingham, furnace	42.88	43.38	....	....
Cincinnati, del.	....	49.09	....	....
Buffalo, furnace	*47.00	*47.00	*47.50	48.00
Boston, del.	55.42	55.42	55.92	....
Rochester, del.	49.22	49.22	49.72	50.22
Syracuse, del.	50.025	50.025	50.525	41.025
§**Chicago,** district furnaces	46.00	46.00-46.50	46.50	47.00
Milwaukee, del.	47.72	47.72-48.22	48.22	48.72
Muskegon, Mich., del.	....	50.98-51.48	51.48	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.17	48.67	48.67	49.17
Lone Star, Tex., furnace	....	†75.00	....	....
Duluth, furnace	....	46.50	46.50	47.00
Erie, Pa., furnace	46.00	46.50	46.50	47.00
Everett, Mass., furnace	....	49.50	50.00	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	53.63	....	....
Portland, Oreg., del.	....	53.63	....	....
Los Angeles, San Francisco	53.13	53.63	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	48.65	49.15	49.65	....
Ironton, Utah, furnace	....	46.50	....	....
‡**Neville Island, Pa.,** furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	....	....	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	42.50	....	....	....
Swedeland, Pa., furnace	50.00	50.50	51.00	....
Toledo, O., furnace	46.00	46.50	46.50	47.00
Cincinnati, del.	50.65	51.05	....	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	49.87	50.37	50.37	50.87

* Republic Steel Corp. quotes $1 a ton higher for basic, No. 2 foundry and malleable at Buffalo.

† Low phosphorus southern grade.

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaco; $1.73 Verona; $1.94 Brackenridge; $1.08 for Ambridge and Aliquippa.

§ Includes, in addition to Chicago, South Chicago, Ill., East Chicago, Gary and Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base)	$59.50		
6.51-7.00	60.75	9.01- 9.50	67.00
7.01-7.50	62.00	9.51-10.00	68.25
7.51-8.00	63.25	10.01-10.50	69.50
8.01-8.50	64.50	10.51-11.00	70.75
8.51-9.00	65.75	11.01-11.50	72.00

F.o.b. Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton. **Electric Furnace Silvery Pig Iron** Si 14.01-14.50%, $84.75 furnace, Niagara Falls; $84 open-hearth and $85 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.45% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. F.o.b. furnace, Lyles, Tenn. ..$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., $54; Buffalo, Troy, N. Y., $50; Philadelphia, $56.81 delivered.

Intermediate phosphorus, Central furnace, Cleveland, $51.

Differentials

Prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more $37; less than 60% $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$13.50-15.50
Connellsville, foundry	16.00-18.00
New River, foundry	16.50
Wise county, foundry	15.35
Wise county, furnace	14.60

Oven Foundry Coke

Kearney, N. J., ovens	$21.50
Chicago, ovens	20.40
Chicago, del.	†21.75
Detroit, del.	23.95
Terre Haute, ovens	21.00
Milwaukee, ovens	21.15
Indianapolis, ovens	20.85
Chicago, del.	24.00
Cincinnati, del.	21.40
Detroit, del.	24.40
Ironton, O., ovens	18.25
Painesville, O., ovens	20.90
Erie, del.	22.57
Cleveland, del.	22.46
Buffalo, del.	23.25
Birmingham, ovens	17.70
Philadelphia, ovens	20.55
Swedeland, Pa., ovens	20.50
Portsmouth, O., ovens	19.25
Detroit, ovens	20.65
Detroit, del.	*21.65
Flint, del.	22.85
Pontiac, del.	21.91
Saginaw, del.	23.15

Includes representative switching charge of: *, $1; †, $1.35.

Coal Chemicals

Spot, cents per gallon, ovens

(Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	20.50-26.50
Toluol, two degrees	23.00-26.50
Industrial xylol	20.50-26.50

Per ton bulk, ovens

Sulphate of ammonia	$45.00

Per pound, ovens

(Effective as of Oct. 1)

Phenol, 40 (car lots, returnable drums)	13.50
Do., less than carlots	14.25
Do., tank cars	12.50

(Effective as of Oct. 25)

Naphthalene flakes, balls, bbl to jobbers, "household use"	13.75

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick

Super Duty: St. Louis, Vandalia, or Farber, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., $100.

High-Heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, or Vandalia, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, Haldeman, or Athens, Ky., Troup, Tex., Stevens Pottery, Ga., or Portsmouth, O., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Pa., Bessemer, Ala., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va., Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., $83; Beach Creek, Pa., $73.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa. $85; Joliet or Rockdale, Ill., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Chrome brick or chemical-bonded chrome brick, $69, magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices pet net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅝" grains; Bulk, $31; single paper bags, $35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibonsburg, Woodville, O., $11.85; Thornton, McCook, Ill., $11.95; Dolly Siding, Bonne Terre, Mo., $12.05.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R. R. freight rates, dock handling charges and taxes thereon effective after Apr. 1, 1948, are for buyer's account.)

Old range bessemer	$6.60
Old range nonbessemer	6.45
Mesabi bessemer	6.35
Mesabi nonbessemer	6.20
High phosphorus	6.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.25

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	15.00
Brazil iron ore, 68-69%	19.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, f.o.b. cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb, Mo., cont., Mines	$0.75

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
Boston (city)	5.84	6.64	7.84	6.04	6.90	5.69	6.39	8.24-9.74	5.54	5.89	7.34
Boston (c'try)	5.69	6.49	7.69	5.89	6.75	5.54	6.24	8.09-9.59	5.39	5.74	7.19
New York (city)	5.73-5.80	6.73	7.74-7.83	6.08-6.28	...	5.73	6.58	8.67	5.52-5.78	5.98	7.48
New York(c'try)	5.53-5.60	6.53	7.54-7.63	5.88-6.08	...	5.53	6.38	...	5.32-5.58	5.78	7.28
Phila. (city)	5.50-5.86	6.61-6.81	7.47-7.67	5.46-5.81	...	5.57-5.65	6.31	8.39	5.24-5.40	5.52-5.65	6.73-7.16
Phila. (c'try)	5.35-5.71	6.46-6.66	7.32-7.52	5.31-5.66	...	5.42-5.50	6.16	8.24	5.09-5.25	5.37-5.50	6.58-7.01
Balt. (city)	5.43†	6.33	7.23	5.49	...	5.54	...	...	5.48	5.68	7.13
Balt. (c'try)	5.28†	6.18	7.08	5.34	...	5.39	...	...	5.33	5.53	6.98
Norfolk, Va.	5.75	...	...	...	...	6.00	7.00	...	6.00	6.00	7.50
Wash. (w'hse)	5.81-5.97	...	...	5.87	...	5.88-5.92	6.58	...	5.82-5.86	6.02-6.06	7.47-7.51
Buffalo (del)	5.00	5.90	7.80	5.71	6.50	5.50	6.05	10.10	5.25	5.50	7.06
Buffalo (w'hse)	4.85	5.75	7.65	5.56	6.35	5.05	5.90	9.95	5.10	5.35	6.91
Pitts. (w'hse)	4.85-5.00§	5.75-5.85[8]	7.15-7.70	5.00-5.35	5.95-6.00	4.90-5.10	5.65	7.65	4.90-5.15	5.05-5.25	6.55
Det. (w'hse)	4.85-5.00§	5.75-5.85[8]	7.15	5.00-5.35	5.95-6.00	5.45	6.17	8.12	5.45	5.65-5.80	7.10
Cleveland (del.)	5.13-5.90‡‡	5.90-6.29	7.34-8.00‡‡	5.17-5.69	6.45-6.85	5.30-5.35	6.05-6.10	8.24-8.54	5.34-5.60	5.50-5.55	6.95-7.00
Cleve. (w'hse)	4.98-5.75	5.75-6.14	7.19-7.85	5.02-5.54	6.30-6.70	5.15-5.20	5.90-5.95	8.09-8.39	5.19-5.45	5.35-5.40	6.80-6.85
Cincin. (w'hse)	5.26	6.11	7.60	5.52	6.07	5.52	6.07	...	5.37	5.61	6.91
Chicago (city)	5.00-5.20	5.90‡[8]	7.30	5.00	6.64-6.80	5.05	5.85	8.25[9]	5.05	5.25	6.70
Chicago (w'hse)	4.85-5.05	5.75‡[8]	7.15	4.85	6.49-6.65	4.90	5.70	8.10[9]	4.90	5.10	6.55
Milwaukee (city)	5.37	6.07‡[8]	7.47	5.17	6.81-6.97	5.22	6.02	8.42[9]	5.22	5.42	6.87
St. Louis (del.)	5.34§	6.24[8]	7.44	5.34	6.64	5.39	6.19[12]	6.64	5.39	5.59	7.04
St. L. (w'hse)	5.19§	6.09[8]	7.29	5.19	6.49	5.24	6.04[12]	9.49	5.24	5.44	6.89
Birm'ham (city)	5.20§	...	6.60	5.20	...	5.15	6.66	...	5.15	5.40	7.41-7.66
Birm'ham(c'try)	5.05§	...	6.45	5.05	...	5.00	6.51	...	5.00	5.25	7.26-7.51
Omaha, Nebr.	6.07	...	9.33	6.07	...	6.12	6.92	...	6.12	6.32	7.77
Los Ang. (city)	6.55§	8.05	8.20†	6.75	9.50	6.20	8.00-8.50	...	6.70	6.40	8.15
L. A. (w'hse)	6.40§	7.90	8.05†	6.60	9.35	6.05	7.85-8.35	...	6.55	6.25	8.00
San Francisco	5.95[21]	7.15	8.05	6.75[21]	8.25[18]	5.90[21]	7.55	10.20‡‡	5.90	7.60	8.10
Seattle-Tacoma	6.35[17]	7.90[8]	8.40	6.70[17]	...	6.20[17]	8.15[1]	9.45[2]	6.30[17]	6.35[17]	8.40[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 39,999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 14,999 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [12]—1000 to 39,999 lb; [12]—1000 lb and over; [16]—2000 lb and over; [17]—300 to 999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb; [23]—Price (but not other price in range) applies to any and all quantities.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § 18 gage and heavier; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ top level of quoted range is nominal.

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants, Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	35 off
⅝ and ¾ x 6-in. and shorter	37 off
⅞-in. and larger x 6-in. and shorter	34 off
All diameters longer than 6-in.	30 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter	37 off
Lag bolts, longer than 6 in.	35 off

Stove Bolts

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. f.o.b. Reg. and Heavy
⅞-in. and smaller	41 off	.....
½-in. and smaller	.....	38 off
⅜-in.-1-in.	39 off	.....
⅞-in.-1-in.	.....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in. and larger	34 off	28 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	46 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	40 off
¾, ⅞, & 1 x 6 and shorter	35 off

Square Head Set Screws

Upset 1-in. and smaller	51 off
Headless, ¼-in. and larger	31 off

Rivets

F.o.b. midwestern plants

Structural ½-in. and larger	6.75c
⅞-in. and under	48 off

Washers, Wrought

F.o.b. shipping point, to jobbers..Net to $1 off

FERROALLOY PRODUCT PRICES

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $57, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn.) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $160 per gross ton of alloy, c.l., packed, $172; gross ton lots, packed, $187; less gross ton lots, packed, $204; f.o.b. Alloy, W. Va., Niagara Falls, N. Y.; or Welland, Ont. Base price; $165, Rockwood, Tenn.; $162, f.o.b. Birmingham and Johnstown, Pa., furnaces; $160, Sheridan, Pa.; $163, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $31 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $201; less gross ton lots, $218 f.o.b. Chicago. Add or subtract $2 for each 1%, or fraction thereof, of contained manganese over 82% and under 78%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 26.0c, ton lot 27.1c, less ton 28.3c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c, Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload, 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.6c per lb of alloy, carload packed, 9.35c, ton lot 10.25c, less ton 11.25c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.05% C 29.25c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Mn 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot add 5c.

SILICON ALLOYS

20-30% Ferrosilicon: Contract, carload, lump, bulk, 16.50-17.50c per lb of contained Si; packed 18.90c; ton lots 20.00c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.5c per lb of contained Si, carload

(*Please turn to Page* 151)

ECA Cuts Nonferrous Metal Quotas

Warns Great Britain, Belgium and Holland of further drastic reductions in lead and aluminum allotments unless profiteering in these metals is halted

New York — Economic Co-operation Administration warned Great Britain, Belgium and Holland last week to stop capitalizing on nonferrous metal shortages in this country by reselling to American companies metal obtained with Marshall Plan funds. ECA has cut lead and aluminum allotments for the three nations and warned of further drastic reductions unless the situation is corrected.

The aluminum industry had protested that European nations used $26 million of United States recovery funds to buy the metal, then resold some of it to users in this country at profits ranging up to 11 cent a pound. According to ECA reports, that agency granted England $23 million during the April-September period for purchase of 81,328 tons of aluminum. In the same period, England exported to the United States 12,812 tons of aluminum scrap.

From April through September, Holland was granted $1,150,000 in Marshall Plan funds for the purchase of 3440 tons of aluminum, but resold 2368 tons to concerns in the United States.

Through October, Belgium was alloted 2250 tons of aluminum with $865,000 of Marshall Plan funds, but reshipped 673 tons to America. For the same period, Belgium received 8000 tons of lead with $2,736,000 of ECA money, while exporting 3860 tons of lead to America through September. Holland had bought 4027 tons of lead through September with $1,786,000 of ECA money, while exporting 1987 tons to the United States.

The three nations involved purchased the aluminum in Newfoundland, Canada, and Latin America, then shipped duty-free aluminum scrap to the United States.

ECA financed purchases of lead for Holland in Mexico and Peru; for Belgium, in Canada and Newfoundland.

Ralph L. Wilcox, acting chief, Nonferrous Metals Division, ECA, said that aluminum obtained in Canada for 16.00c a pound could be resold in the United States for as much as 30.00c.

Copper—Production and deliveries of copper declined sharply during November, due chiefly to the strike at Kennecott Copper Corp.'s Utah properties. Crude copper production dropped to only 58,151 tons in November compared with 81,474 tons in October. Output included 51,088 tons of primary copper against 73,454 tons in October while production of secondary copper totaled 7063 tons. November output was the lowest since July, 1946, when 56,906 tons were produced.

Refined copper production in the United States totaled 102,779 tons in November against 101,436 tons in the previous month.

Shipments from producers last month totaled 100,055 tons against 112,580 tons in October. Because of the sales allotment program, stocks of refined copper held by domestic producers were placed at 89,756 tons at the end of November, a gain of 13,385 tons.

Crude copper output of foreign mines and custom smelters aggregated 108,701 tons in November compared with 109,474 tons in October. Refined copper production outside the United States totaled 93,801 tons against 90,836 tons in October.

Nonferrous Metals Committee of the National Association of Purchasing Agents estimates that the copper market, as of Dec. 3, is short 56 per cent of its normal supply. "Any consideration of advancing the present high prices," the report said, "should be discouraged . . . Buyers should hesitate to pay premium prices. Copper will continue tight for, at least, the first six months of 1949."

Brass Ingot—One leading producer of brass ingots reduced prices ½-cent a pound on the 85-5-5-5 and yellow brass ingots and 1 cent a pound on ingot No. 245, effective as of Dec. 13. This was attributed to easiness in the red metal scrap market. A refiner reduced its buying prices 1 cent a pound last week for No. 1 copper wire and proportionate amounts on other grades of copper scrap. Auto radiators were cut ¼-cent. Some of the larger producers of brass ingot temporarily withdrew from the market and likely will do little buying until after the turn of the new year.

Lead—Demand for lead continues greatly in excess of supply. In looking forward to 1949, the purchasing agents pointed out that any improvement in quantities produced or imported, or in volume of secondary lead supply, will be offset by a pent-up demand.

Zinc—While there has been some improvement in the production of slab zinc, consumer demand, particularly for prime western grade, continues in excess of supply.

American Zinc Oxide Co., Columbus, O., warned striking employees that unless they returned to their jobs by Dec. 15, their names would be dropped from the company's payroll records. The strike has been in progress since Aug. 13.

Tin—Distribution and use controls over tin and antimony are still needed to help check the inflationary effects of supply shortages, Secretary of Commerce Charles Sawyer said last week. According to the Department of Commerce, total primary supply of tin for the United States in 1948 is estimated at 83,000 tons compared with 64,195 tons in 1947. Total secondary supply is estimated at 26,800 tons compared with 26,482 tons in 1947. Consumption of tin, excluding transfer to the strategic stockpile, is estimated at 91,200 tons in 1948 compared with 87,181 tons in 1947. Government stocks of pig tin, exclusive of the permanent stockpile, are estimated at 45,000 tons against 24,555 tons at the end of 1947. Industrial stocks, including metal in process, are estimated at 22,000 tons against 23,550 tons at the end of 1947. Total stocks of pig tin and tin in concentrates are estimated at 85,000 tons against 67,387 tons a year ago.

Fluorspar Sets Postwar Highs

Washington — Domestic production, shipments, imports and consumption of fluorspar established postwar highs in the third quarter of 1948, according to the Bureau of Mines. A feature of the import statistics was the receipt of 1379 tons from Germany, the first since 1939. Receipts of fluorspar at steel plants in the third quarter were substantially greater than consumption, consequently stocks gained 32 per cent and on Sept. 30 were sufficient for about five months' requirements.

Production and shipments of fluorspar of domestic origin of all grades were 95,552 and 95,683 short tons, respectively, in the third quarter, increases of 17 and 15 per cent over the previous quarter.

Consumption of fluorspar was 102,324 tons in the third quarter, compared with 97,235 tons in the previous quarter.

Stocks of fluorspar at consumers' plants (130,952 tons) on Sept. 30 were 25 per cent more than on June 30, but stocks at mines (40,048 tons) were virtually unchanged.

Seeks More Foreign Copper

New York — Measures to stimulate copper production in foreign countries, for the benefit both of the United States and of the nations participating in the European Recovery Program, were urged by C. Donald Dallas, chairman, Revere Copper & Brass Inc., in a letter to Paul G. Hoffman, Economic Co-operation Administrator.

Mr. Dallas reported that the effect of the copper mine strike in Utah, added to the stockpiling program of the Munitions Board, had been to aggravate an already critical copper supply problem, and forced consumers to face the possibility of reduced operations and of further price increases in this basic metal. He added:

"Imports rose sharply in the months before these new conditions faced us, but did not serve to create a cushion for emergencies; in fact, combined fabricators' and refiners' stocks of copper in the United States declined by 32,000 tons in the first nine months of 1948."

Foreseeing further increases in world demand for copper, Mr. Dallas said that "under these circumstances, and entirely apart from temporary conditions, the copper consumer is moved to inquire whether ECA has been able to take any steps to increase the supply of copper. We know that ECA operations create funds in the participating countries which are available for the purchase of strategic raw materials, but these funds are of little moment if supplies are unavailable."

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 23.50c, Conn. Valley; Lake, 23.62½c. Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 21.50-22.00c; 88-10-2 (No. 215) 31.00c; 80-10-10 (No. 305) 27.25c; No. 1 yellow (No. 405) 17.50c.

Zinc: Prime western 17.50c, brass special 17.75c, intermediate 18.00c, East St. Louis; high grade 18.50c, delivered.

Lead: Common 21.30-21.35c, chemical and corroding 21.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, fob shipping point, freight allowed.

Secondary Aluminum: Piston alloy (No. 122 type) 26.50-27.00c; No. 12 foundry alloy (No. 2 grade) 25.75-26.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 28.00-30.00c; grade 2, 26.75-27.50c; grade 3, 25.75-26.25c; grade 4, 25.25-25.50c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, fob Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, fob Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; shot nom.; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 46.50c. Prices include import duty.

Mercury: Open market, spot, New York $79-$81 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2, del.; special or patented shapes, $2.10.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 70.00c per ounce.

Platinum: $93-$96 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110-$115 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill)

Sheet: Copper 37.18; yellow brass 34.59; commercial bronze, 95%, 37.23; 90%, 36.88; red brass, 85%, 36.01; 80%, 35.66; best quality, 35.33; nickel silver, 18%, 46.92; phosphor-bronze, grade A, 5%, 56.05.

Rods: Copper, hot rolled 33.28; cold drawn 34.28; yellow brass, free cutting, 38.16; commercial bronze, 95% 36.92; 90% 36.57; red brass, 85% 35.70; 80% 35.35.

Seamless Tubing: Copper 37.22; yellow brass 37.60; commercial bronze 90% 39.54; red brass 85% 38.92; 80% 38.57.

Wire: Yellow brass 34.88; commercial bronze, 95% 37.52; 90% 37.17; red brass, 85% 36.30; 80% 35.95; best quality brass 35.62.

Copper Wire: Bare, soft, fob eastern mills, c.l. 29.42½c, l.c.l. 29.92½-30.05c; weatherproof, fob eastern mills, c.l. 29.60-29.85c, l.c.l. 30.35c; magnet, delivered, c.l. 32.75-33.50c, 15,000 lb or more 33.00-33.75c, l.c.l. 33.50-34.25c.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l. (Two producers quote 1-cent per pound lower.)

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, fob Cleveland, Pittsburgh)

Sheets: Full rolls, 140 sq ft or more, $27.25 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft. Pipe: Full coils, $27.25 per cwt; cut coils, $27.50. Traps and Bends: List price plus 80%.

ZINC

Sheets, 22.00-22.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 20.75-21.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 19.75-20.50c; over 12-in., 20.75-21.50c.

NICKEL

(Base prices, fob mill.)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, fob mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb., 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9%, flake, fob Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed 33.84c; oval 33.34c; electrodeposited, 31.09c; cast, 30.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 46.00c, fob Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 16.00c; 1000 to 19,900 lb, 15.00c, fob Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; fob Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 26.50c; 275-lb, or 500-lb bbl, 24.50c, fob Cleveland, freight allowed on barrels, or 3 or more kegs.

Tin Anodes: Bar, 1000 lb and over 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c fob Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 39.25c, fob Cleveland; 39.00c, Detroit; 38.00c, fob Philadelphia.

Stannous Sulphate: Less than 2000 lb, in 100 lb kegs, 100.00c, in 400 lb bbl. 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, Wis.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb fob shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.125	21.125	20.375
Yellow brass	18.875	18.625	18.125
Commercial Bronze			
95%	20.250	20.000	19.500
90%	20.125	19.875	19.375
Red brass			
85%	20.000	19.750	19.250
80%	19.875	19.625	19.125
Best Quality (71-79%)	19.750	19.500	19.000
Muntz Metal	18.250	18.000	17.500
Nickel, silver, 10%	20.250	20.000	10.000
Phos. bronze, A	22.625	22.375	21.375
Naval brass	18.750	18.500	18.000
Manganese bronze	18.750	18.500	17.875

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 20.75, No. 2 copper 19.75, light copper 18.75, composition red brass 17.00-17.25, auto radiators 14.25, heavy yellow brass 13.25-13.50, brass pipe, 13.50-13.75.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 20.50-21.50, No. 2 copper 19.50-20.50, light copper 18.50-19.50, refinery brass (60% copper), per dry copper content 18.75-19.50.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 19.00-19.50, No. 2 18.00-18.50, light copper 17.00-17.50, No. 1 composition red brass 15.25-15.50, No. 1 composition turnings 14.75-15.00, mixed brass turnings 8.75-9.00, new brass clippings 15.75-16.25, No. 1 brass rod turnings 12.75-13.25, light brass 8.75-9.25, heavy yellow brass 11.00-11.25, new brass rod ends 13.25-13.75, auto radiators, unsweated 12.75-13.00, cocks and faucets 12.25-12.50, brass pipe 12.75-13.25.

Lead: Heavy 19.50-20.00, battery plates 13.25-13.50, linotype and stereotype 19.50-20.00, electrotype 18.50-19.00, mixed babbitt 19.50-20.00, solder joints, 23.00-24.00.

Zinc: Old zinc 10.00-10.50, new die cast scrap 9.00-9.25, old die cast scrap 6.75-7.25.

Tin: No. 1 pewter 65.00-67.00, block tin pipe 83.00-84.00, No. 1 babbitt 51.00-54.00, siphon tops 50.00-52.00.

Aluminum: Clippings 2S 16.50-17.00, old sheets 13.00-13.50, crankcase 13.00-13.50, borings and turnings 6.50-7.00, pistons, free of struts, 13.00-13.50.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Nov. Avg.	23.50	21.325	16.580	103.00	17.00	38.50	40.00	73.655
Oct. Avg.	23.50	19.325	15.173	103.00	16.846	37.423	40.00	77.226
Dec. 1-16	23.50	21.30-21.35	17.50	103.00	17.00	38.50	40.00	70.00

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00*
No. 1 Busheling	42.50-43.00*
Nos. 1, 2 Bundles	42.50-43.00
No. 3 Bundles	40.50-41.00
Machine Shop Turnings	37.50-38.00
Mixed Borings, Turnings	37.50-38.00
Short Shovel Turnings	38.00-39.00
Cast Iron Borings	39.50-40.00
Bar Crops and Plate	49.00-50.00
Low Phos. Steel	49.50-50.00
Heavy Turnings	39.50-40.00

Cast Iron Grades

No. 1 Cupola	65.00-66.00†
Machinery Cast	72.00-73.00†
Charging Box Cast	61.00-62.00†
Heavy Breakable Cast	60.00-61.00
Malleable	74.00-75.00
Brake Shoe	57.50-58.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.50-44.00
R.R. Malleable	75.00-80.00
Axles	55.25-56.25
Rails, Rerolling	59.00-60.00
Rails, Random Lengths	56.00-57.00
Rails, 3 ft and under	60.00-61.00
Rails, 18 in. and under	61.50-62.00
Railroad Specialties	56.00-57.50†
Uncut Tires	54.50-55.00
Angles, Splice Bars	53.00-54.00

* Plus applicable freight springboard. † Nominal; no recent sales.

CLEVELAND

No. 1 Heavy Melt. Steel	$42.00-42.50*
No. 2 Heavy Melt. Steel	42.00-42.50*
No. 1 Busheling	42.00-42.50*
Nos. 1 & 2 Bundles	42.00-42.50*
Machine Shop Turnings	37.00-37.50
Mixed Borings, Turnings	36.50-38.50
Short Shovel Turnings	38.00-38.50
Cast Iron Borings	38.00-38.50
Bar Crops and Plate	47.00-47.50
Punchings & Plate Scrap	47.00-47.50
Heavy Turnings	42.00-43.00
Alloy Free Turnings	40.00-41.00
Cut Structurals	48.50-51.50

Cast Iron Grades

No. 1 Cupola	73.00-75.00
Charging Box Cast	60.00-62.00
Stove Plate	65.00-67.00
Heavy Breakable Cast	57.00-62.00
Unstripped Motor Blocks	60.00-62.00
Malleable	78.00-80.00
Brake Shoes	55.00-57.00
Clean Auto Cast	73.00-75.00
No. 1 Wheels	64.00-66.00
Burnt Cast	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*
R.R. Malleable	79.00-81.00
Rails, Rerolling	62.00-68.00
Rails, Random Lengths	60.00-61.00
Rails, 3 ft and under	63.00-66.00
Cast Steel	55.00-57.00
Railroad Specialties	58.00-60.00
Uncut Tires	58.00-59.00
Angles, Splice Bars	61.00-63.00

* Plus applicable freight springboard on earmarked material.

VALLEY

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00
No. 1 Bundles	42.50-43.00
Machine Shop Turnings	37.00-39.00
Short Shovel Turnings	39.00-39.50
Cast Iron Borings	38.50-39.00
Low Phos.	48.50-50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*

* Plus applicable freight springboard.

MANSFIELD

Machine Shop Turnings	$37.50-38.00
Short Shovel Turnings	39.50-40.00

CINCINNATI

No. 1 Heavy Melt. Steel	$42.00
No. 2 Heavy Melt. Steel	42.00
No. 1 Busheling	42.00
Nos. 1 & 2 Bundles	42.00
Machine Shop Turnings	36.00
Mixed Borings Turnings	36.00
Short Shovel Turnings	38.00
Cast Iron Borings	37.00

Cast Iron Grades

No. 1 Cupola Cast	63.00
Charging Box Cast	53.00
Heavy Breakable Cast	59.00
Stove Plate	55.00
Unstripped Motor Blocks	56.00
Brake Shoes	50.00
Clean Auto Cast	63.00
Drop Broken Cast	71.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00
R.R. Malleable	75.00
Rails, Rerolling	62.00
Rails, Random Lengths	58.00
Rails, 18 in. and under	63.00

DETROIT

(Brokers' buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$37.50-38.00
No. 1 Busheling	37.50-38.00
Nos. 1 & 2 Bundles	37.50-38.00
No. 3 Bundles	37.50-38.00
Machine Shop Turnings	31.50-32.00
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings	32.50-33.00
Cast Iron Borings	32.50-33.00
Punchings & Plate Scrap	42.50-43.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast	54.00-59.00
Clean Auto Cast	60.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$48.00-49.00
No. 2 Heavy Melt. Steel	41.75-42.25
No. 1 Busheling	41.75-42.25
No. 1 & 2 Bundles	41.75-42.25
Machine Shop Turnings	39.50-40.00
Mixed Borings, Turnings	39.50-40.00
Cast Iron Borings	39.50-40.00
Short Shovel Turnings	40.50-41.00
Low Phos	49.00-51.00

Cast Iron Grades

No. 1 Cupola	67.00-68.00
Mixed Cupola	63.00-65.00
Heavy Breakable Cast	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	70.00-72.00

Railroad Scrap

Rails, 3 ft. and under	59.00-61.00
Railroad Specialties	58.00-60.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$45.00-45.50
No. 2 Heavy Melt. Steel	41.50
No.1 Busheling	41.50
Nos. 1 & 2 Bundles	41.50
No. 3 Bundles	39.50
Machine Shop Turnings	37.50
Mixed Borings, Turnings	37.50
Short Shovel Turnings	41.00-41.50
Bar Crop and Plate	49.00-51.00
Punchings & Plate Scrap	49.00-51.00
Cut Structurals	49.00-51.00
Elec. Furnace Bundles	47.00-48.00
Heavy Turnings	45.50-46.50
No. 1 Chemical Borings	41.00-41.50

Cast Iron Grades

No. 1 Cupola Cast	62.00-63.00
No. 1 Machinery Cast	65.00-66.00
Charging Box Cast	62.00-62.50
Heavy Breakable Cast	62.00-62.50
Unstripped Motor Blocks	59.50
Malleable	80.00-82.00
Clean Auto Cast	62.00-63.00
No. 1 Wheels	71.00-72.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$39.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	35.00
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings	30.00-31.50
Punching & Plate Scrap	41.00-42.00
Cut Structurals	41.00-42.00
Elec. Furnace Bundles	41.00-42.00

Cast Iron Grades

No. 1 Cupola Cast	57.00
Charging Box Cast	57.00
Heavy Breakable	57.00-58.00
Unstripped Motor Blocks	53.50-54.50
Malleable	68.00-69.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$38.90
No. 2 Heavy Melt. Steel	34.40
No. 1 Bundles	34.40
No. 1 Busheling	34.40
Machine Shop Turnings	29.90
Mixed Borings, Turnings	29.90
Short Shovel Turnings	31.90
Bar Crops and Plate	40.00-41.00
Punching & Plate Scrap	40.00-41.00
Chemical Borings	37.00-38.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast	52.00-53.00
Stove Plate	54.00-55.00
Unstripped Motor Blocks	50.00-52.00
Clean Auto Cast	54.00-56.00

CHICAGO

No. 1 Heavy Melt. Steel	$41.50-42.00
No. 2 Heavy Melt. Steel	41.50-42.00
No. 1 Bundles	41.50-42.00
No. 2 Bundles	41.50-42.00
No. 3 Bundles	39.50-40.00
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings	38.50-39.00
Cast Iron Borings	37.50-38.00
Bar Crops and Plate	46.00-47.00
Punchings	47.00-48.00
Elec. Furnace Bundles	44.50-45.00
Heavy Turnings	41.00-41.50
Cut Structurals	46.50-47.00

Cast Iron Grades

No. 1 Cupola Cast	70.00-71.00
Clean Auto Cast	70.00-71.00
No. 1 Wheels	60.00-62.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	45.00-46.00
Malleable	81.00-82.00
Rails, Rerolling	69.00-70.00
Rails, Random Lengths	59.00-60.00
Rails, 3 ft and under	60.00-61.00
Rails, 18 in. and under	64.00-65.00
Railroad Specialties	52.00-53.00
Angles, Splice Bars	56.50-58.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$44.00-45.00
No. 2 Heavy Melt. Steel	40.00-41.00
Machine Shop Turnings	35.00-36.00
Short Shovel Turnings	36.50-37.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-66.00
Mixed Cast	56.00-58.00
Heavy Breakable Cast	59.00-60.00
Brake Shoes	60.00-61.00
Clean Auto Cast	65.00-67.00
Burnt Cast	59.00-60.00

Railroad Scrap

R.R. Malleable	71.00-72.00
Rails, Rerolling	63.00-65.00
Rails, Random Lengths	56.00-59.00
Rails, 3 ft and under	60.00-61.00
Uncut Tires	51.00-52.00
Angles, Splice Bars	54.00-56.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Long Turnings	24.50
Short Shovel Turnings	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	40.00
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	63.00
Stove Plate	60.00-62.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	nom.
Axles, Steel	50.00
Rails, Rerolling	53.00-55.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under	53.00-55.00
Angles and Splice Bars	52.00-53.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$27.50
No. 2 Heavy Melt Steel	*27.50
No. 1 Busheling	*27.50
Nos. 1 & 2 Bundles	*27.50
No. 3 Bundles	*24.50
Machine Shop Turnings	*18.00
Bar Crops and Plate	*27.50
Cast Steel	*27.50
Alloy Free Turnings	*18.00
Cut Structurals	*27.50

Cast Iron Grades

No. 1 Cupola Cast	50.00-65.00

Railroad Scrap

No. 1 Heavy Melting	*28.50
Axles	*34.00
Rails, Random Lengths	*29.00

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$29.00-30.00
No. 2 Heavy Melt. Steel	29.00-30.00
No. 1 Busheling	29.00-30.00
Nos. 1 & 2 Bundles	29.00-30.00
No. 3 Bundles	24.50
Machine Shop Turnings	21.00-22.50
Mixed Borings, Turnings	21.00-22.50
Punchings & Plate Scrap	35.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	50.00
Heavy Breakable Cast	35.00
Stove Plate	30.00
Unstripped Motor Blocks	32.50
Malleable	40.00
Brake Shoes	35.00
Clean Auto Cast	40.00
No. 1 Wheels	37.50-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.50
Railroad Malleable	30.00
Rails, Random Lengths	30.00-32.00
Angles and Splice Bars	28.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
Nos. 1 & 2 Bundles	27.50
Machine Shop Turnings	20.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	33.00-36.00

Cast Iron Grades

No. 1 Cupola Cast	45.00-50.00

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Heavy Melt.	$23.00
No. 1 Bundles	23.00
Mechanical Bundles	21.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Busnelings	17.50
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	48.00-50.00
No. 2 Cast	44.00-45.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

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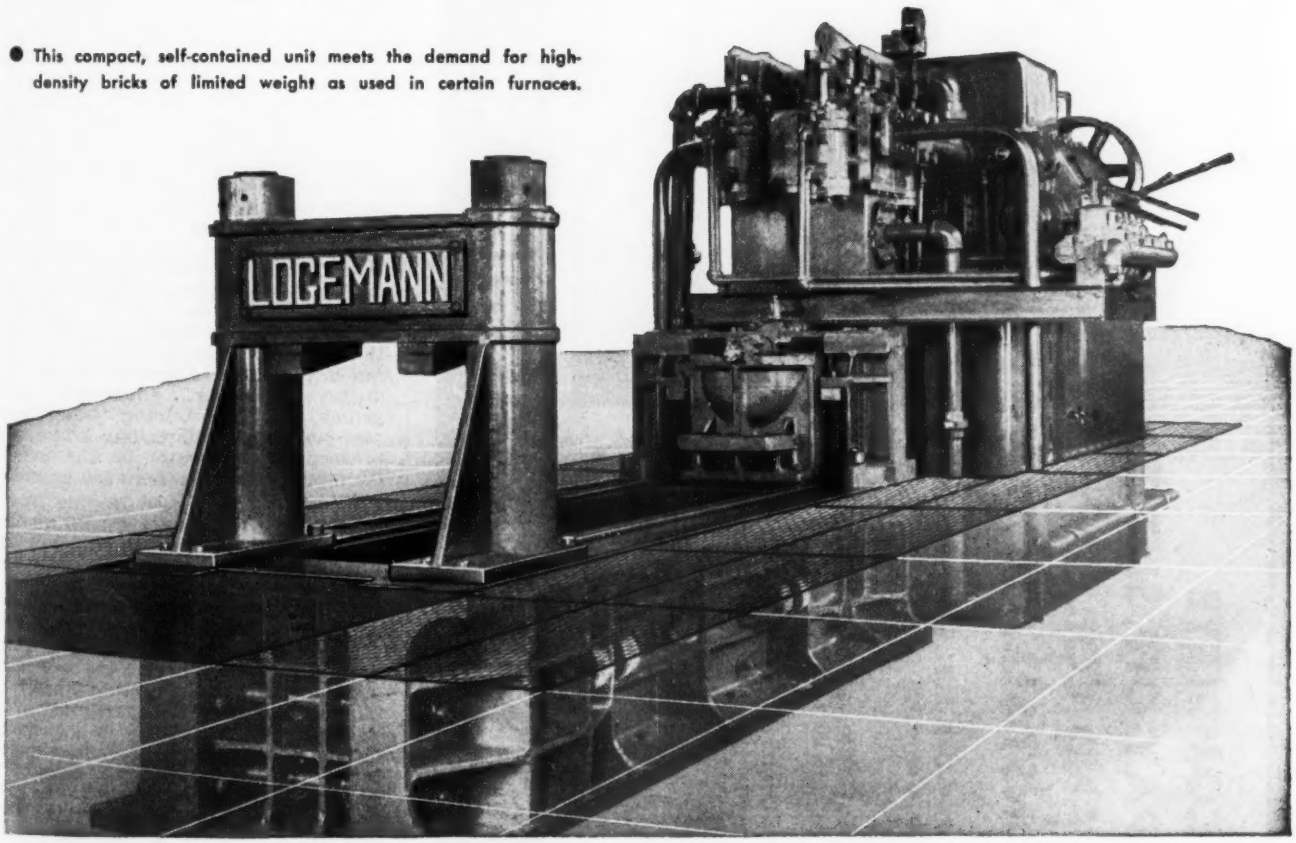

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Sheets, Strip . . .

Sheet and strip pressure not easing despite spotty demand for some end-use products

Sheet Prices, Page 128

Philadelphia—Apart from the more or less superficial influences of the holiday and yearend inventory season, sheet specifications continue active. There has been no important easing in any direction due to a decline in demand for some end-use products. This may come in spots as the new year gets under way, but, if so, there will continue to be such strong demand in most directions that the overall pressure will remain about as heavy as ever for some months to come. Meanwhile, one large sheet metal worker in this district is having Belgium slabs converted into sheets in an effort to augment flat rolled requirements. Various other conversion operations, involving both sheets and plates, continue.

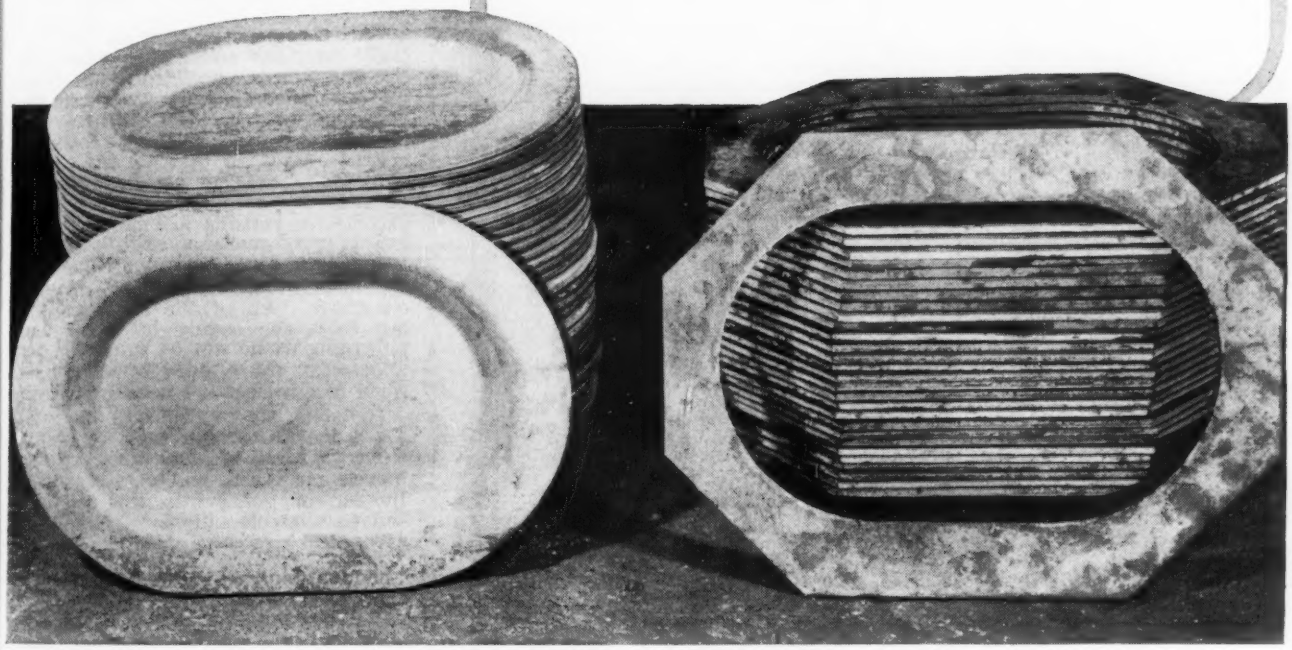
On the basis of capacity, the great proportion of hot and cold-rolled sheet tonnage has not been allocated beyond February, except for priority work. The situation is somewhat different in galvanized sheets, with relatively more non-certified tonnage having been allocated for the entire period. Pressure is still on in Washington for voluntary allocation of 50,000 tons of sheets, virtually all galvanized, for grain storage bins. However, even should this program later be adopted, it is doubtful if much, if any, would come out of first quarter production.

Pittsburgh — To date Jones & Laughlin Steel Corp., Republic Steel, Weirton and Great Lakes are reported to be the only companies that have adjusted extras on hot-rolled sheets and strip. Similar action is contemplated by other companies. Government and industry officials are reviewing each voluntary allocation program in light of probable change in steel requirements since monthly tonnage commitments were agreed upon earlier this year. It is reported, for example, the Department of Commerce has under consideration review of the prefabricated steel house allocation program with the possibility that it may be cut back substantially. This action is based on the contention that steel home manufacturers have not stepped up production in quantities warranted by the amount of steel allocated to the industry. However, additional programs, such as mining machinery, are under consideration, while increased commitments to the petroleum program and others are possible.

New York — Some leading sheet sellers have not as yet set up quotas to noncertified customers beyond February, preferring to await further developments with respect to voluntary allocations programs. Those who have established allotments for the entire quarter are warning customers that they may have to make subsequent cuts. In certain lines, including electrical sheets and even galvanized sheets, there is a general disposition to allocate the entire quarter; in stainless steel and certain other specialties, there would be no hesitancy in booking up for the entire three months if business were

These steel plate shapes are almost ready for use

Very little work is required to turn these blanks into manhole assemblies



Add the fittings and these manhole parts are ready for installation. Production can be as simple as that when By-Products Steel Co. blanks and forms the steel plate shapes you need.

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Typical parts produced by us are shown in Bulletin 270. For a copy, or for a quotation on your plate product requirements, write By-Products Steel Co., Division of Lukens Steel Company, 414 Strode Ave., Coatesville, Pennsylvania.

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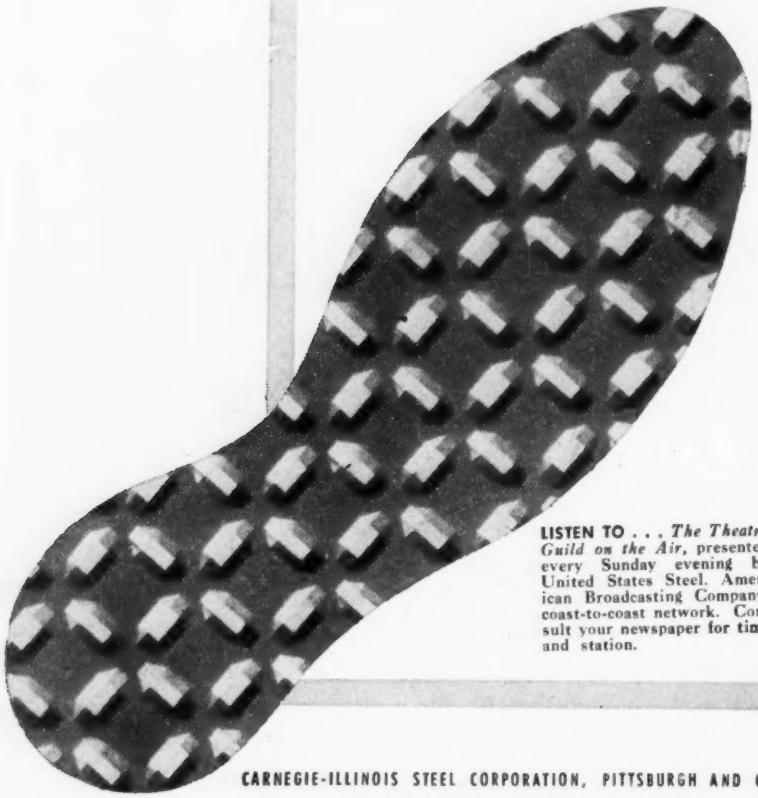

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available. However, in most of these specialties there is not the advance interest.

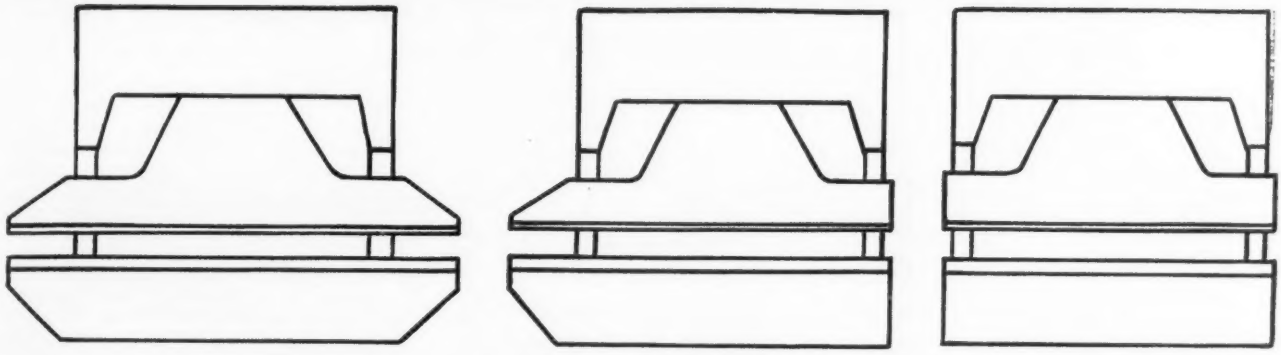
Boston—If steel requirements are less with some consumers they are reluctant to defer delivery or stop buying for fear of loss of quotas and position on mill books. Thus, while scattered consumer lines are moving more slowly at retail, effect on demand at mill level is hardly noticeable. Carryovers on most flat-rolled products, stainless excepted, will be heavy entering the new year and first quarter allotments are generally lower as additional tonnage is scheduled for certified allocation. Cold strip mill schedules will be subject to revision depending on incoming hot-rolled strip. Further adjustments in price for that product to balance recent hot-rolled extras is likely. Stainless demand is active despite mixed price structure and that grade is becoming competitive with copper fabricated products in the sheet-metal working industries, notably construction.

Cleveland — Although an increasingly cautious attitude is displayed by purchasers, no let-up has been noticed in overall demand on mills for flat-rolled carbon steel. Where one consumer reduces demand, there is another ready to take up the available tonnage. One producer reported that discontinuance of steel allocations for housing and heating programs may make a slightly larger tonnage of flat-rolled steel available for March delivery to the general consumer. All of the slack resulting from the ending of those two programs would not be available, for allotments for certain other allocations programs have been increased.

Republic Steel Corp. will have no flat-rolled galvanized steel available from its Alabama City, Ala., mill in March and April, and possibly May. Instead of going into this product the raw steel will be diverted to plates and large line pipe.

Chicago — Belief of steel men is that when a general easing in end-product production comes it will not be translated into lessened demand for steel products in short supply for a considerable period. Inventories of steel are generally so low and unbalanced as to require months of rebuilding on present quotas. Several users of galvanized sheets are experiencing what they think is a seasonal letup in business and are not planning any reduction in their ordering volume. Among sheet users, galvanized is generally the tightest product. Some relief may be provided when several voluntary allocation programs for this product go out of existence early next year. Another now under consideration, however, would act as an offset. One cold-rolled strip user here who buys about 90 per cent of his requirements from mills reports now having a little less difficulty in placing his orders, although most consumers note no change in supply.

In the irregular steel market, premium steel offerings are more numerous and the price of both hot and cold-rolled material is down. More competition among consumer durable goods manufacturers is thought to be the cause, since it rules out to some extent continued purchase of



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Steelweld Presses are obtainable with various bed and ram extensions. While standard bed machines are most generally used and take care of a wide range of bending, forming and punching work, a single or double bed extension often is very helpful.

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Cincinnati—Sheet mills, approaching the yearend, find a heavy carryover despite all efforts this quarter to meet quotas in full. Production has remained high without serious interruptions, but the carryover could not be eliminated. The allocations for next quarter have been reduced in another effort to build a schedule which will cut the overhanging tonnage. Military needs are represented by more frequent and somewhat heavier ordering. Reports of cutbacks in some lines, specifically household appliances, are not reflected in mill demands.

Los Angeles — Books have been closed by Columbia Steel Co. for January and February sheet and strip production. First quarter tonnages at the Torrance and Pittsburg plants are virtually filled for all rolled and drawn products. Kaiser's Fontana mill is booked on sheet and strip through February, and now is accepting March tonnages.

Steel Bars . . .

Bar Prices, Page 128

Boston — Except for a somewhat better balance in cold-finished bar inventories, both industrial and warehouse, bar demand shows slight change with supplies limited. Only in spots is demand slower, one being small tool forgings while screw machine product requirements are probably below peak levels. Among larger consumers, textile mill machinery builders are pressing for tonnage. Some producers are about to open books for second quarter on cold-drawn alloys.

Chicago — The problem of inventory accumulations gives purchasing agents new responsibilities as business forecasters. In bars, for example, one company has found it necessary to stock a six-months' supply because mill deliveries extend that long. This necessitates exercise of shrewd business judgment to avoid being overstocked or understocked in case of change in product demand during that period. At the present time, however, consumers in all lines are pressing as hard as ever for all the tonnage they can get. Farm equipment manufacturers, while faced with an imminent shift to a buyers' market, have not slackened their ordering. Pressure from automotive and machine tool interests also has not diminished.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 128

New York — Reinforcing bar supply here appears more stringent than ever, with some leading mills now six to eight weeks behind on current commitments. Exceptonally fine fall weather has added to the pressure for reinforcing steel. Demand involves few outstanding projects, but a considerable number of small tonnages.

Chicago — What normally would be a very attractive project, tonnagewise, seems to have bumped squarely into the steel shortage. Bids were taken last week on 21,000 tons of reinforcing for outlet pipe for Ft. Randall dam, South Dakota. One possible supplier in Chicago, in telling prospective bidders what it could

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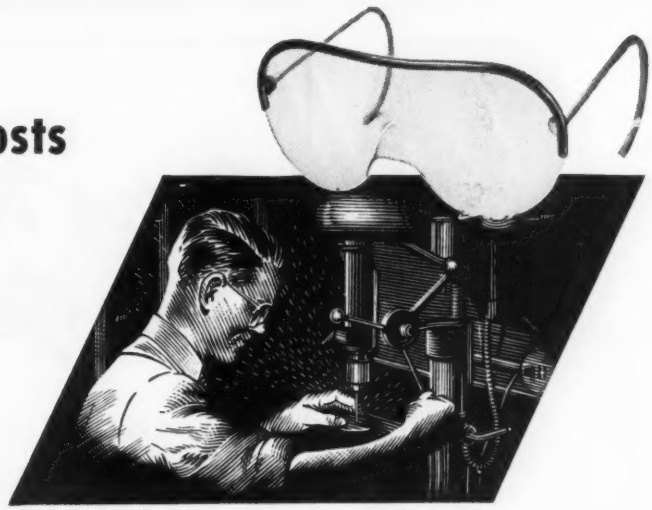

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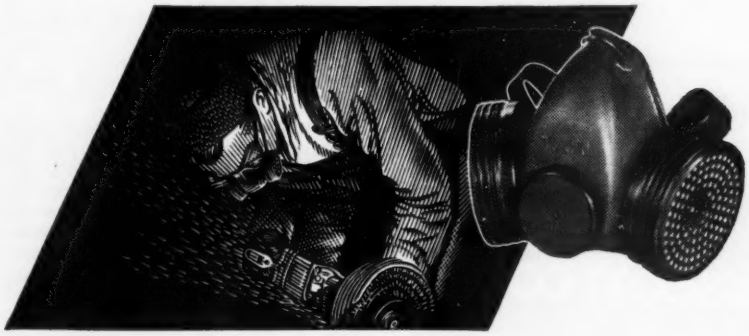

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do in respect to supplying this tonnage could promise the steel on the basis of 200 tons a month—a nine-year proposition at that rate, for a job which the U. S. Engineers want to complete in about two years.

Stainless Steel Up in East

Reading, Pa.—Carpenter Steel Co. has advanced base prices about 2½ cents a pound on stainless bars, hot and cold strip and forging billets, effective Dec. 13. The company also established new extras. Prior to Dec. 13, the company had in effect an across-the-board increase of 10 per cent in the base prices and extras, which was announced Aug. 4. Except for quantity and packing, new extras are now the same as those which prevailed from Jan. 20, 1947, to Aug. 4, 1948. As for new quantity extras, the base on bars and billets has been changed from 40,000 pounds to 10,000 pounds, thus bringing the base quantity in line with certain of the company's other stainless products. Packing charges have been doubled.

Tin Plate . . .

Tin Plate Prices, Page 129

Pittsburgh—Carnegie-Illinois Steel Corp. has adopted the following higher quotations on tin mill products not mentioned in its original announcement, also effective Jan. 1: Heavy coated manufacturing ternes up 95 cents to $8.10 per base box on 8-lb coating and up $1.20 to $9.35 per base box on 15 lb; roofing ternes up $2 to $17.50 per double base box; holloware enameling black plate up 55 cents to $5.30 per 100 pounds.

Very few consumers of tin mill products have registered opposition to 1949 price levels, particularly when extent of production cost increases are pointed out.

In commenting on similar tin plate price action taken by National Steel Corp., E. T. Weir stated that the average increase in prices on total consumption of tin plate is less than the average increase applying to other steel products and much less than the price increase on commodities in general.

Cleveland — Republic Steel Corp. announced last week its tin mill products prices will be increased Jan. 1. They will correspond with those announced recently by Carnegie-Illinois Steel Corp. As tin mill products are sold on yearly contracts, the prices on them were not increased when other steel product prices rose this last year.

Youngstown—Youngstown Sheet & Tube Co. announced last week that it will boost its prices Jan. 1 on tin plate, all of which is produced at Indiana Harbor, Ind. The increases are identical with those announced by Carnegie-Illinois Steel Corp.

St. Louis — Granite City Steel Co. has announced tentative price increases for tin mill products effective Jan. 1. Hot-dipped tin plate will be up 95 cents to $7.95 per base box of 100 pounds for 1.50-lb coated and up 90 cents to $4.70 for 1.25-lb coated. Holloware enameling black plate, 29 to 31 gage, will go up $11 a ton to $5.50.

Tin Plate Export Prices Rise

New York—United States Steel Export Co. has announced the following new export base prices covering tin mill products with freight included to New York, Philadelphia or Baltimore. These prices per base box apply on carload lots and will become effective with shipments made on and after Jan. 1. Tin plate No. 107: American coke, 1.25 lb, $8.85; 1.50 lb, $9.10; Ferrostan, unassorted, 0.25 lb, $7.80; 0.50 lb, $8.05; 0.75 lb, $8.35; Special coated manufacturing ternes, unassorted, $8; Manufacturing ternes, unassorted, $8.55.

Tin Can Price Advance Pends

New York—Following the rise in the price of tin plate of 55 to 95 cents per base box of 100 pounds, can manufacturers believe the raw material increase will be partially reflected in their prices in the coming year. An official of Continental Can Co. is quoted as saying that the price rise will probably be between 5 per cent and 10 per cent for finished cans. The company pointed out that the raw material rise amounts to an increase of between 10 per cent and 14 per cent in the price of tin plate.

Structural Shapes . . .

Structural Shape Prices, Page 129

New York — Public work continues to dominate structural activities in this district. Private work has dipped rather appreciably, although a rebound may come after the turn of the year. Some programs are being held up pending the President's remarks to the new Congress next month. Meanwhile, some fabricators welcome a respite in new demand as backlogs are heavy. Certain leading fabricators are booked ahead six to eight months for the most part, although some modest tonnages might be worked in earlier, depending upon the character of the work.

Boston — Structural tonnage being estimated is lowest in months and more projects are postponed or suspended including public works; estimated costs are generally higher than appropriations. Deliveries on tonnage fabricated from mill allotments range from five to six months and steel wanted in less time comes largely from available stocks which are limited and unbalanced. Cost of material fabricated from the latter steel ranges from 12 to 14 cents per pound in place, a controlling factor in some suspensions.

Philadelphia—While there is a scattering of private work, structural activity is comprised principally of public demand. Bridge work is especially prominent. Fabricators still complain of a shortage of structural shapes and plates. They could step up fabrication appreciably, if a larger and more rounded supply of steel were available.

Philadelphia Chamber of Commerce has announced that six major oil companies have set aside $163 million for expansion in the port of Philadelphia during 1949. The Texas

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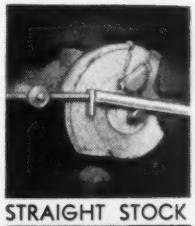
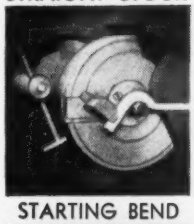
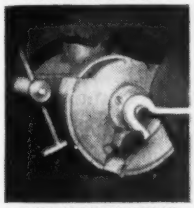
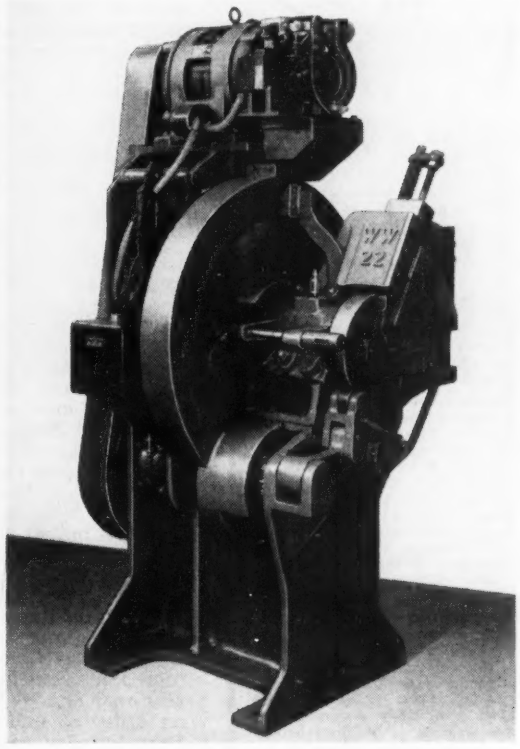

STRAIGHT STOCK


STARTING BEND


COMPLETE BEND

FINISHED EYE



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GENERAL ELECTRIC

Co. plans to spend $50 million; Gulf Refining Co., $40 million; Sun Oil Co., $20 million; Atlantic Refining Co., $20 million; Socony-Vacuum Oil Co., $18 million; and Sinclair Refining Co., $15 million.

Chicago—Lagging interest in new large-size construction continues to characterize the fabricating industry here. Most fabricators feel that costs are not an adequate explanation, although unquestionably some jobs have been abandoned or deferred for this reason. A majority think that seasonal factors are to blame, but it can be pointed out that weather up to now has been favorable. Whatever the cause, the let-up in business plus shortage of shapes has caused some fabicators in the Calumet area to lay off a number of workmen and the labor market has eased somewhat. Small jobs and some bridge work combine to keep order backlogs at a good level and steel demand strong, however.

Plates . . .

Plate Prices, Page 129

New York — Tank fabricators report a lull in demand, which they ascribe in part to seasonal influences and in part to disposition of many to first hear what the President will have to say to Congress next month. This lull, in one sense, is welcomed by fabricators for the reason that they are not only booked months ahead (in some cases a year or more) but are behind on current commitments. This latter is due largely to the increasing stringency in plates—a stringency that is being particularly felt by non-certified consumers. It is estimated that soon more than 40 per cent of plate production will be diverted to certified buyers.

Ship work is gradually being stepped up, thus creating a further drain on plates. According to the Shipbuilders Council of America, 77 merchant vessels of 1000 gross tons and over and two large dredges were on order or under contruction as of Dec. 1, in private shipyards.

Boston — With more plate tonnage slated for certified allocation and volume for open distribution narrowing, fabricating shops are on reduced operations geared to available supply which for first quarter is lower. Some tank shops are long on heads, but short on plates. More mills are limiting acceptance of orders for 3/16 and 3/8-inch plates to 25 per cent; another mill has gone on quotas for floor plate. Demand for floor plate is heavy, indicating considerable tonnage is being substituted for carbon plates; small household fuel tanks fabricated of floor plate are priced about double those made of No. 12 gage sheet and are moving more slowly. Demand for 3/16-inch heads for sheet fabricated tanks is strong. Small pressed heads, 24-inch and under, can be shipped in five to six weeks; larger, up to 48-inch, eight to 10 weeks. Spun heads are in February. Stainless clad, plates and heads are available in six to eight weeks.

Philadelphia—Due to holiday influences, a little less pressure is noted for plates. However, basically, requirements are as heavy as ever, and producers see no real let-up for months to come. Where there may

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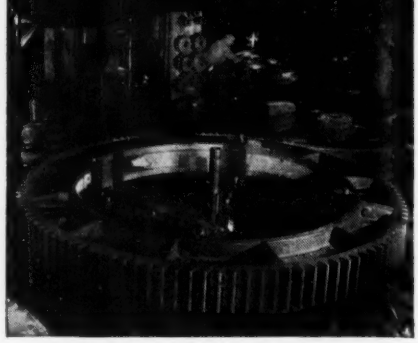

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be an easing off in some lines as time goes on, they expect an increase in others, notably in ship work and oil tank construction. Requirements for the latter already far exceed available supply. Stringency in plates is reflected in a continued strong and active gray market. A leading eastern plate producer only within the past week has been able to set up non-certified quotas for January and, as arrearages are going to be substantial, the amount of new free tonnage will be relatively light. Certain other large producers have set up quotas through February, but no further.

Los Angeles — Kaiser Co. Inc. has closed its books on first quarter plates. The Geneva plant is booking for February, but quotas have been considerably reduced from this year. Plates still are by far the tightest category for the western steel industry, and the gray market is reported active again in this product. A little supply help will result from ending of the maritime tie-up, although in the case of plates this will be limited to small tonnages of special types not produced by West Coast mills. Despite the official termination of the shipping strike, unloading of harbor-bound vessels has been slow, and steel consumers have yet to feel the effect of released cargoes.

Wire . . .

Wire Prices, Page 129

Boston — While there are a few spots among the hundreds of finished wire products, there is no overall slackening in demand with most consumers taking first quarter allotments in full. Bedding and mattress spring wire continues to lag while music wire can be supplied from stock in more sizes. Only in the larger range of sizes is heading wire available in the volume required, screw manufacturers redrawing to size frequently for middle and smaller sizes. Some progress is being made toward catching up on wood screw backlogs. While there are more delivery postponements, demand in other directions more than balances scattered suspensions.

Birmingham — Clamor for wire continues. Continued mild weather has resulted in a renewal of demand from agricultural sources, especially for fencing and nails. Major jobbers still have no more than a fraction of their needs gaged by consumer demands.

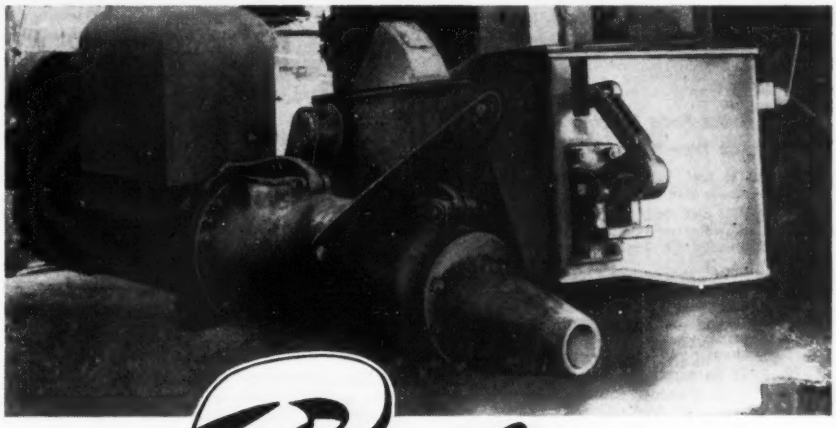
Warehouse . . .

Warehouse Prices, Page 131

Pittsburgh — Jones & Laughlin Steel Corp.'s warehouse steel prices on hot-rolled sheets and strip were revised upward Dec. 10 to reflect higher gage, width and pickling extras put into effect Dec. 3 on mill products. No action yet has been taken in passing on to customers the increased cutting to length extras. The mill now charges an extra for all lengths and gages, while formerly there was a base range, and also advanced these extras. Most distributors have not taken similar action in adjusting extras on sheets and strip for their suppliers have not revised quotations in line with action taken by some producers. Yearend inventory taking has resulted in slightly less pressure for steel delivery from warehouse stock, with some customers specifying early January shipments. No significant lessening in demand is indicated through early months next year.

Philadelphia — While December business up to now has been comparable with the November rate, jobbers look for the holiday lull to cause a drop in the month's total. Business this fall has been unusually steady, with most distributors reporting little variation during the months of September, October and November. One leading jobber reports a peak in October for the entire year to date, but in general the trend has been quite even. One distributor advanced prices last week on stainless bars.

Chicago — Warehousemen cite plates as the product for which demand farthest outstrips supply. One large interest last week reported having an inquiry from a heavy industrial equipment builder for about a hundred sizes ranging from 3/8-in. to 5-in. in thickness. The warehouse was unable to supply a single item on the list. Pressue is being exerted by an eastern specialty steel mill for delivery of plates urgently needed by a machinery builder to complete



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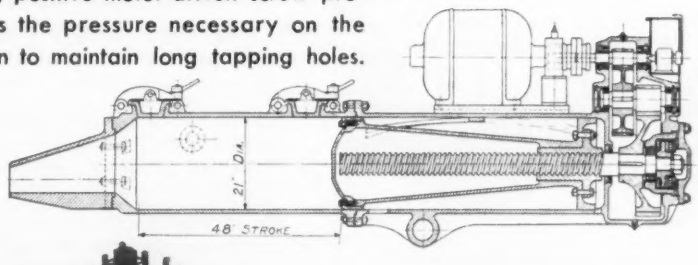

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GENERAL ELECTRIC

some equipment for the mill; this request likewise could not be met. With mill quota cuts for next quarter, industrial consumers have intensified their demands on warehouses with only disappointment as the result.

Dissatisfaction over discontinuance by some mills of the functional discount on stainless steel to warehouses is reportedly causing some distributors to consider dropping the product. Warehouses which can sell carload lots for direct shipment from the mill get a brokerage fee for the service and don't have the expense of handling and storing the material. On warehouse shipments, however, the narrow margin of profit which quantity discounts provide is believed by some to be inadequate compensation for the service performed.

The local expansion project of Joseph T. Ryerson & Son Inc., estimated to cost $3,750,000 when completed, is expected to do much toward speeding the flow of steel from mill to consumer.

Cincinnati—Ordering of steel from warehouse continues in excess of supplies in almost all items. Jobbers so far discern no lag in buying which might be expected prior to holidays and inventory-taking. Those who have been notified of mill quotas for next quarter find cuts as high as 30 per cent in volume, but this may be only a paper figure if fourth-quarter allotments are fulfilled.

Los Angeles — Although supplies are a little better in some categories, steel jobbers report an inventory situation that is badly out of balance. Sheet, plates, and some structural items are in extremely short supply. If available at all, plates are expected to bring substantial premiums in the first quarter. Buyers from Texas are active in this market, filling requirements for oil and irrigation pipe at premium rates. Warehouses are benefiting from consignments being released in the harbor, particularly in long-length structurals. One firm is receiving a considerable tonnage of wide-flange beams. Current tapering of demand is noted by some jobbers, due apparently to holiday factors. The slowing up is concentrated largely on light, miscellaneous products required by small fabricators.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 129

New York — Bolt and nut backlogs are tapering and now average around eight weeks. Some makers have been able to gain about four weeks on some sizes, especially heavy bolts, since early fall. In general, backlogs on heavy bolts now range around six weeks, with the small sizes holding at around ten weeks. In addition to a reduction in domestic requirements is a sharp drop in export needs, due primarily to shortage of dollars abroad. Some makers describe export demand as being "dead."

Some of the present lag may be ascribed to yearend influences, however. Demand from wholesale jobbers is believed to be particularly affected by these influences. Some makers report a slight easing in steel supply, although supply is still short of requirements. In fact, certain makers continue to turn to the gray market for some specifications.

Tubular Goods . . .

Acute shortage of pipe extended to boiler and hot mechanical tubing

Tubular Goods Prices, Page 129

New York — Scarcity in plain boiler tubing has now become almost as pronounced as in the regular lines of merchant pipe. One large producer has practically withdrawn from the market and certain others are concentrating largely on alloy tubing. As a matter of fact, one leading producer of hot-finished carbon boiler tube is now sold ahead for all of 1949 and has only a little tonnage available in cold-drawn carbon boiler tubing for shipment in the next quarter. On certain of the small sizes, 1-1/2 inches and under, deliveries are still being quoted for March.

The effects of this scarcity in plain boiler tubing are reflected by action of some boiler shops in holding up shipments on a product as scarce as plates, because of their inability to obtain sufficient tubing to go ahead with their fabrication.

Hot mechanical tubing also is quite scarce, some producers having nothing to offer for several months. One leading seller is promising June shipment on sizes ranging from 1-1/2 to 2-9/16 inches, 9 gage and heavier, but is sold much farther ahead on the larger sizes. On some of the small sizes of cold-drawn mechanical tubing, this producer, on the other hand, can do six and eight weeks.

The general run of merchant pipe is being shipped on a quota basis, with no one apparently receiving as much as they would like to have, and with the producers limiting advance sales. Commitments on pipe line tonnage continue to be made well into the future, with some producers booked into 1954 and being offered tonnage for shipment still beyond in some cases.

Chicago — Present and proposed pipe line and oil field expansion promise to maintain demand for steel at its present high level far into the future. One district tubing manufacturer, seeking strip tonnage commitments from mills for the next two years, has been unable to place orders and continues to rely on consumers' steel. A garment rack maker, whose pipe has always been supplied in carload lots, now reports having to buy it by the foot, and can get only a small fraction of the tonnage he needs to satisfy the demand for his product.

Los Angeles—Kaiser Co. Inc. has some pipe tonnage open for the first quarter, but books probably will be closed soon. New demand from oil companies is off somewhat, with pipe fabricators ascribing this to the fact that 1948 budgets are virtually exhausted. Until close of the year, refineries generally will restrict their purchases to maintenance needs. Reopening of ocean shipping raises again the vista of the tremendous expert potential for pipe and oil field equipment which South America represents. Although the market is huge, suppliers believe that little material will be shipped for the time being. Export licenses are difficult to obtain, in some instances requiring months, sales costs are high, and fab-

ricators believe their first obligation is to take care of hard-pressed domestic consumers.

Seattle — Demand for cast iron pipe is in a seasonal slump, but renewed interest is expected early in 1949. Meanwhile distributors are busy handling shipments long delayed by the maritime strike. The first 20,000 feet of 8-inch pipe, due months ago, has just arrived. The city has on order about 4000 tons of 8-inch material, some of it placed in July, 1947, and is planning 10 major projects outside of the city, requiring large tonnages of cast iron pipe.

Pig Iron . . .

Pig Iron Prices, Page 130

New York — Shipments of pig iron here this month should about equal those for November. Some foundries are taking in a little less, due to restricted demand for their products, but others appear willing to take in all they can get and in some cases are getting more than anticipated. The holiday season will adversely affect the melt, but foundries that have a good backlog of business are expected to take in all pig iron shipped during that period. Meanwhile, only a few orders are being booked for foreign iron, the price for which continues easier.

Boston—Pig iron melt has slipped with some foundries more than expected and for the first time in many months one or two deferments in shipments are asked. One New York state furnace has experienced suspensions of foundry iron. More foundries are increasing ratio of iron to scrap in melts and this factor is contributing to sustained demand. Most shops could take further cuts in demand for their product without easing demand for iron. Not only is heavier iron ratio desirable from quality standpoint, but current differential between cast iron scrap and pig iron is a factor. Consumers of basic continue hard pressed for tonnage.

Pittsburgh—Merchant pig iron requirements show no sign of easing in this area despite reports some jobbing foundries have been forced to curtail operations because of dwindling order backlogs. Continued heavy demand for railroad equipment and industrial machinery has more than offset the slight reduction in pig iron requirements from small jobbing concerns. Jones & Laughlin Steel Corp. was scheduled to blow in its No. 3 blast furnace at Aliquippa Works late last week. There are now only 2 out of 47 units idle in the district.

Philadelphia—Latest word with respect to the Chester, Pa., blast furnace is that it will blow in Dec. 20, working up shortly to an output of 250 tons a day and then moving up to 400 tons in late January when the installation of blower equipment is scheduled to be completed.

While some foundries will close down for a week or ten days over the holidays, most of them indicate that they will be prepared to accept all pig iron shipped. In general, it is believed that the foundry melt will be off this month from that for November. This will be due not only to year-end seasonal influences but to the fact that some foundries have

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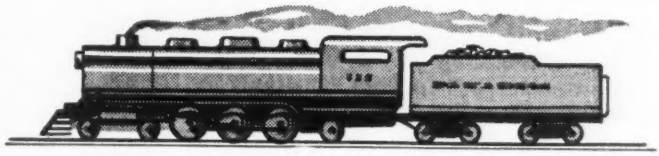

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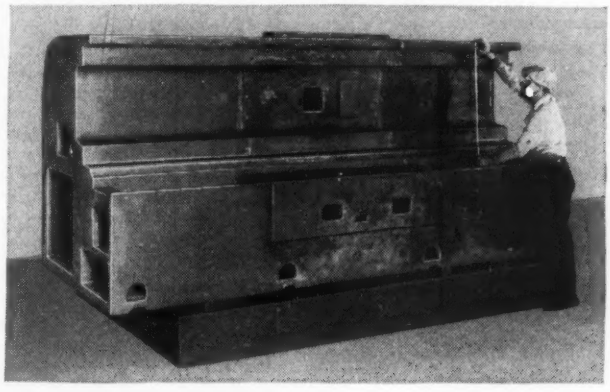

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GENERAL ELECTRIC

slowed up operations due to a decline in business.

Buffalo — Relighting of Bethlehem Steel's "H" blast furnace at Lackawanna last week increased supplies of steelmaking pig iron by 1250 tons daily and boosted the district rate to 100 per cent. Relining of the furnace was completed in somewhat less than the expected 60 days. In the merchant iron field, easement in gray iron business was minimized by some trade leaders, who contend the effect of cutbacks in home appliance castings had been felt chiefly by smaller jobbing foundries. Lessened demand for high-priced foreign iron was noted, and prices were reported off about $40 from the peak $110 to $120 range of a few months ago.

Cincinnati—Shipments of northern iron into this district are fair but those of southern iron still fall below levels maintained earlier in the year. Melters continue to show eagerness for iron, despite shrinkage in the melt with the jobbing foundries and those on machine tools hardest hit by a dip in demand. So far, few if any foundries have been able to create a normal pig iron stock. Increased supplies of oven foundry coke have reduced needs for beehive in this district.

Chicago — Full-blown competition for casting business has returned to the area. Contraction in order backlogs has compelled a number of captive foundries to withdraw patterns from job shops to keep their own men busy. A number of captive foundries also have reduced their operations. There are some indications of an easing in coke supply. Interlake Iron Corp. last week blew in its furnace which had been down for relining.

Plans for blowing out one of Inland Steel Co.'s blast furnaces just before Christmas have been shelved, the furnace now being scheduled to operate into early January. The unit was to have been taken off to conserve ore until the navigation season reopens, but by juggling schedules the effect on ore stocks occasioned by lengthening the furnace's campaign is being minimized.

Birmingham — While there has been some tapering off in foundry operations, demand for pig iron from other sources has more than offset this lag. Most pipe plants still are short on iron, although the most critical stage has likely been passed. Merchant melt is at capacity.

St. Louis — Pig iron production appears to have been established at a 1040 to 1100 ton daily rate. After Jan. 1 the last remaining production deterrent—quality coal—is expected to vanish. Some coal producers in the southern Illinois districts are reporting a number of no-bill loaded cars on hand.

1948 Iron Ore Shipments Rise

Cleveland — Shipments of Lake Superior iron ore from upper lake ports increased to 82,937,291 tons for the 1948 season, an increase of 5,039,204 tons over the 1947 total of 77,898,087 tons, according to the Lake Superior Iron Ore Association, this city. The 1948 total was the third largest in history, having been exceeded only by the wartime peak years of 1942 and 1943 when 92,076,781 tons and 84,404,852 tons, respectively, were shipped.

In December, 500,818 tons were shipped, a decrease of 36,152 tons, or 6.73 per cent, from the December, 1947, total of 536,970 tons. The 1948 season's shipments compared with those for 1947 were as follows:

	1948	1947
Escanaba	4,760,529	4,141,643
Marquette	4,091,428	4,744,651
Ashland	5,302,923	5,249,772
Superior	29,727,358	25,802,412
Duluth	19,116,644	19,364,852
Two Harbors	18,747,287	16,964,098
Total U.S. ports	81,746,169	76,267,428
Michipicoten	508,556	428,852
Port Arthur	682,566	1,201,807
Canadian	1,191,122	1,630,659
Grand Total	82,937,291	77,898,087

Scrap . . .

Scrap Prices, Page 134

Philadelphia — Major open-hearth grades of steel scrap continue generally strong. In fact, on some lots of railroad steel as high as $47 has been paid. Short shovel turnings are at least temporarily higher at $41 to $41.50 due to buying by one eastern Pennsylvania consumer. While no borings are being shipped for chemical purposes at this time, they are moving to blast furnaces at around $41 to $41.50.

Weakness continues in certain of the leading cast grades, with No. 1 machinery off $1 to $65 to $66. On the other hand, malleable, which is extremely scarce, is slightly higher at $80 to $82, delivered, and No. 1 wheels at $71 to $72.

December importations of German scrap are expected to surpass the 80,700 tons brought in in November, a total which brought shipments of this scrap into this country during the first 11 months up to 237,000 tons. Assuming December importations of at least 90,000 tons, the total for the year would amount to 327,000 tons. As for scrap importations this year from all sources, some trade estimates place the total in excess of 600,000 tons.

New York—Scrap brokers have reduced buying prices on No. 1 cupola and charging box cast to a flat $57, f.o.b. shipping point, and on heavy breakable to a spread of $57 to $58. All other prices, including the major steel items, are unchanged.

Boston—Steel scrap consumers are resisting premium prices and have all but eliminated them with bulk of heavy melting steel moving at formula. While prices have not declined below formula levels, demand is slower with consumers more conservative as to analysis. Cast grades are slow with prices somewhat easier.

Pittsburgh — Scrap buying is light here with some integrated mills out of the market until after Jan. 1, while others are contracting for new tonnage only on a selective basis. This action is prompted by the comfortable inventory position of consumers. Few trade authorities are willing to predict at what price levels larger mills will re-enter the market early next year. While no open-hearth scrap grades yet have been offered at levels below those prevailing recently, there are some grounds for anticipating such action in the near future. Downward trend in cast scrap prices appears probable with many foundries currently out of the

market and having dwindling order backlogs. On the basis of recent bids for railroad scrap items, it would appear railroad specialties will be awarded at somewhat lower price levels. A small tonnage of turnings recently sold at $39.

Cleveland — The business decline of foundries has sharply cut down the demand for cast grades of scrap. Recently quoted prices still stand, but little material is being moved. Because of the improvement in mills' inventories of open-hearth scrap the incentive to pay over the formula prices has practically evaporated, although demand for material is still good.

Buffalo — Although the scrap market is in a yearend waiting period, scattered sales are reported of steelmaking grades which generally worked out at about $1, or slightly more, above the quoted formula basis. In addition, business took place in the No. 1 heavy melting market at the outside figure of the prevailing range of $48 to $49 a ton. Yearend adjustments of inventories leave most leading dealers' yards with only light supplies on hand. This indicates the volume of business transacted above formula; no sales at the formula price of $42.25 for No. 2 heavy melting and allied items have been reported for many weeks. An easier tone continues to rule the cast market.

Chicago—Steel mill scrap buying was almost nonexistent last week and prices of open-hearth grades were nominally unchanged. One mill asserts if it wanted bundles it could easily get them at $40. Rerolling rails have dropped $2. Railroad specialties, bar crops and plate, and punchings were also off in last week's market, while the top of the range in angles and splice bars was up slightly. Decreased foundry activity has had no apparent effect on cast scrap prices, although the tone has weakened.

Cincinnati — A softening tendency is noted in prices of iron and steel scrap, although there are no downward adjustments in this district. Melters have adequate inventories, from 60 to 90 days, and have been receiving shipments steadily due to mild weather which also has spurred collections.

Birmingham — General easing in scrap is noted, although prices remain generally unchanged. One of the district's largest brokers anticipates a definite trend downward at the start of the new year.

St. Louis — The scrap market continues uncertain. Undertone of the cast scrap market is softening, but brokers have not yet lowered quotations. Sales are off as a result of occasional foundry cutbacks and increased pig iron supplies. Steelmaking scrap is holding firm, but some consumers are not committing themselves past the first of the year, hoping for a price drop. Inventories are 45 days or better and are increasing. In contrast to former years, shipments are holding up, with dealers foregoing their former custom of curtailing for income tax purposes.

Seattle — Scrap receipts are about equal to consumption, inventories showing no increase. The market is firm at $30 gross, f.o.b. mill, this price subject to increase in individual

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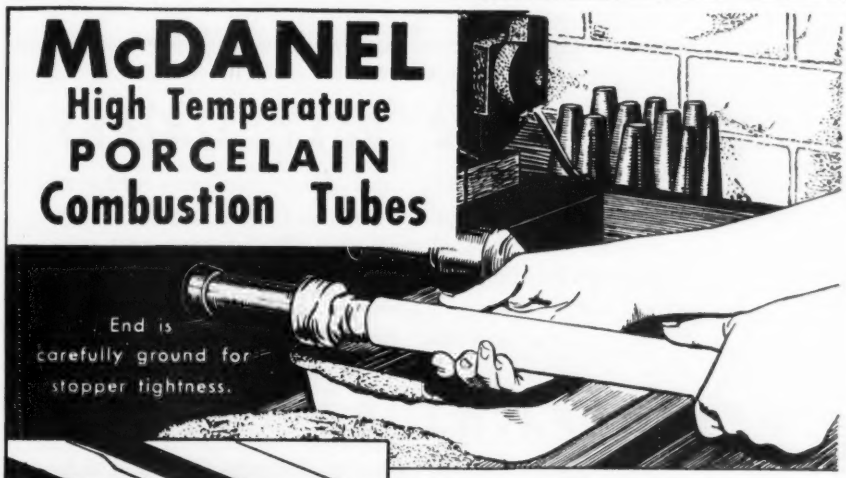

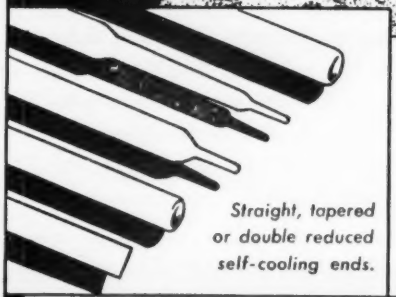

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BEAVER FALLS PENNSYLVANIA

sales. Electric furnace scrap commands up to $38. As high as $25.50 is reported paid for chips.

Buyers report cast iron scrap in ample supply for present foundry requirments, the price maintained at $50.

Los Angeles—Mills here are hungry for steelmaking scrap. One plant is currently using about 25 per cent scrap, composed largely of machine shop turnings, material it ordinarily would not use. Another mill in efforts to obtain adequate supplies of better quality materials has been paying a $3 premium for No. 1 melting steel. Numerous reasons are advanced for the tight supply situation here: Shipbreaking is nearly ended on the Pacific Coast; demand is greater than ever before; some materials are being diverted from western consuming centers; and many dealers who have fairly ample stocks on hand are sitting tight in the hope of higher prices. Punchings and plate scrap have been strong in recent weeks, with current quotation $33 to $36. Cast iron grades, on the other hand, are extremely easy, with many foundries for the time being either out of the market or on a reduced work schedule. No. 1 cupola cast is down $5, currently being quoted at $45 to $50.

Foundry Reaffirms Prices

Hamilton, O. — Hamilton Foundry & Machine Co. has announced generally unchanged prices for the first quarter. Customers have been informed of this action as follows: "Casting prices as established on Oct. 1, 1948, and now in effect will be generally continued for shipments through Mar. 31, 1949. Until that date prices on jobs, upon which there are no current quotations, will be computed on the Oct. 1, 1948, basis."

Canada . . .

Toronto, Ont. — Iron and steel production in Canada for October shows increases over the month immediately preceding and also for the corresponding month last year, according to figures presented by the Dominion Bureau of Statistics. Production of pig iron amounted to 186,424 net tons, or 79.9 per cent of capacity compared with 182,465 tons in September, or 80.9 per cent.

Production of steel ingots and castings for October amounted to 281,866 net tons for a daily average of 87.5 per cent of capacity, compared with an operating rate of 82.7 per cent for September.

Delivery Time Cut

A SIX-DAY delivery policy and price reductions averaging 5 per cent on a new line of flux-filled studs covering approximately 70 per cent of Nelson Stud Welding's total volume has been announced by George E. Gregory, vice president and general manager of Morton-Gregory Corp., which purchased the stud welding business last April from Ted Nelson, an ex-shipyard welder.

The new management has effected substantial cost reduction as the result of a six months' production and marketing study, which provided the basis for improved design and large-scale production of 60 lengths and diameters as standards. Studs in diameters ranging from ¼ in. through ½ in., and in ¼ in. lengths from one to three inches, will be inventoried for six-day delivery, instead of six to eight weeks under previous special-order practice.

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For plating, pickling and chemical fume removal systems give long maintenance-free service under severe conditions of acid and alkali fumes and condensation. Spray application of the ⅛" thick lining assures complete coverage of the most intricate shapes and sections. Bonds to wood or steel.

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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5500 tons, steam generating plant, Buffalo Niagara Electric Corp., Dunkirk, N. Y., to Bethlehem Steel Co.; Stone & Webster Engineering Corp., Boston, general contractor.

4000 tons, 14-story office building, Board of Transportation, Brooklyn, to Harris Structural Steel Co., New York.

3100 tons, miscellaneous beam spans, state of Pennsylvania, to Bethlehem Steel Co.

2550 tons, section, municipal ferry terminal, St. George, Staten Island, to Bethlehem Steel Co.

800 tons, plant extension, Lehigh Portland Cement Co., Fordwick, Va., to Bethlehem Contracting Co., Bethlehem, Pa.

640 tons, building, St. Bonaventure College, St. Bonaventure, N. Y., to the R. S. McMannus Steel Construction Co., Buffalo, through the George A. Fuller Co.

550 tons, state bridge, Ulster county, New York, to Bethlehem Steel Co.

410 tons, building, Burke Brewery Co., Long Island City, Long Island, through George A. Fuller Co., to Bethlehem Steel Co.

400 tons, store building, C. A. Rowell estate, Philadelphia, to Bethlehem Steel Co.

350 tons, addition, Public School No. 246, Manhattan, to Dreier Structural Steel Co., Long Island City, N. Y.

300 tons, bakery, Elmira, N. Y., to American Bridge Co., Pittsburgh.

250 tons, Washington state Cle Elum bridge, to Poole, McGonigle & Dick, Portland, Oreg.; M. P. Butler, Seattle, general contract.

200 tons, warehouse, East 98th St., New York, to Bethlehem Steel Co.; W. G. Hauser, architect.

185 tons, bridge, Concord, N. H., to Bethlehem Steel Co.

175 tons, addition, Junior high school No. 54, New York, to Bethlehem Steel Co.

175 tons, power house addition, Hershey Chocolate Co., Hershey, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

165 tons, Lehigh Valley grade crossing elimination in New Jersey, to Bethlehem Steel Co.

165 tons, New York Central bridge No. 38, Irvingdale, N. Y., to American Bridge Co., Pittsburgh.

150 tons, addition, diesel shop, Pennsylvania Railroad, Enola, Pa., to Belmont Iron Works, Eddystone, Pa.

150 tons, plant addition, Seymour Mfg. Co., Seymour, Conn., to Berlin Construction Co., Berlin, Conn.

120 tons, building, Wood & Selick, Cranford, N. J., to Elizabeth Iron Works, Elizabeth, N. J.

110 tons, Shield of David Home, Andrews and Tremont Aves., Bronx, N. Y., to Grand Iron Works, New York.

100 tons or more, shipway extension, Bath Iron Works, Bath, Me., to Berlin Construction Co., Berlin, Conn.

100 tons, Alaska railroad power house, Fair-

...nks, Alaska, to Isaacson Iron Works, Se...ttle; Morrison-Knudsen Co., general con...ract.

STRUCTURAL STEEL PENDING

...tons, plant addition, General Electric Co., Philadelphia; bids through United Engineers & Constructors, that city, Dec. 21.

...tons, bridge, truss spans, Lancaster, N. H.

...tons, sulphuric acid plant, Tacoma smelter; building permit issued.

300 tons, Columbia river highway overpass (also 85 tons reinforcing) general contract to Valley Construction Co., Portland, Oreg., low $326,318 to Public Roads Administration.

125 tons, Public Roads Administration West Gallant river bridge, Washington state, Isaacson Iron Works, Seattle, low for fabricating material.

120 tons, roll storage building, Delaware Floor Products Co., Wilmington, Del.; bids asked.

100 tons, Y.M.C.A. building, Greenfield, Mass.

Unstated, Detroit dam, Oregon state, bids to U. S. Engineer, Portland, Oreg., about Feb. 4.

Unstated, steel frame warehouses, Whittier and Fort Richardson, Alaska; bids to Col. W. E. Potter, Alaska district engineer, Seattle, Jan. 11 and 12.

REINFORCING BARS . . .

REINFORCING BARS PENDING

125 tons, substructure Clearwater river bridge; new bids soon to state highway department, Boise, Idaho.

Unstated, Detroit concrete gravity dam, Santiam river, Oregon; bids to U. S. Engineer, Portland, about Feb. 4.

Unstated, Oregon state highway bridge, Tillamook county; bids to highway department, Portland, Dec. 20.

PIPE . . .

CAST IRON PIPE PENDING

350 tons, 6 and 8 inch, or alternatives; bids in to Kent, Wash.; award pending.

Unstated, 14,000 feet 10 to 4 inch, or alternatives; bids to R. L. Preston, secretary, Roberts Creek district, Roseburg, Oreg., Jan. 3; H. L. Gilbert, Portland, engineer.

RAILS, CARS . . .

RAILROAD CARS PLACED

Canadian National, 25 coaches, to Canadian Car & Foundry Co., Montreal.

Indianapolis & Louisville, 30 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago. Pullman also will supply 25 steel underframes for construction of 25 stock cars in the railroad company's shops at Lafayette, Ind.

Northern Pacific, 250 fifty-ton gondolas and 200 seventy-five-ton ore cars, to its own shops and 250 forty-ton refrigerator cars to Pacific Car & Foundry Co., Renton, Wash.

RAILROAD CARS PENDING

Detroit & Toledo Shore Line, 100 seventy-ton steel covered hoppers, bids asked.

RAILS PLACED

New York Central, approximately 100,000 tons of rail for 1949 delivery, with the major portions going to the Carnegie-Illinois Steel Corp., Pittsburgh, and to Bethlehem Steel Co., and the remainder, for laying in Canada, to the Algoma Steel Co., Algoma, Ont.

LOCOMOTIVES PLACED

Delaware & Hudson, 17 diesel-electric switch engines to the American Locomotive Co., New York; 12 will be of 1500 horsepower and five of 1000-horsepower.

Indianapolis & Louisville, three 1500-horsepower road-type switching locomotives and two 600-horsepower yard switching locomotives, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

CONSTRUCTION AND ENTERPRISE

ARIZONA

RILLITO, ARIZ.—Arizona Portland Cement Co. has awarded a $1,300,000 contract to Fisher Contracting Co., S. Nineteenth Ave., Phoenix, for construction of more than 20 buildings including crusher, storage and mill buildings, silos, and a dust collecting system.

CALIFORNIA

E. LOS ANGELES, CALIF.—Union Hardware & Metals Co., 411 E. First St., Los Angeles, plans to build a $3,250,000 warehouse and office; A. C. Martin Associates, 33 S. Beaudry St., Los Angeles, architects.

OAKLAND, CALIF.—Fruehauf Trailer Co., 10940 Harper Rd., Detroit, has awarded a $225,000 contract to Collins Construction Co., 1430 S. Alameda St., Los Angeles, for erection of a shop and store building.

SOUTH GATE, CALIF.—Purex Corp., 9300 Rayo Ave., is planning to build a $130,000 spray and dryer building; David R. Edwards, 5911 Pine Ave., Maywood, engineer.

SOUTH GATE, CALIF.—Pittsburgh Erie Saw Corp. is erecting a $150,000 factory building at 5767 Imperial Highway; Davies, Keusder & Brown, 4915 Exposition Blvd., Los Angeles, contractors.

ILLINOIS

FRANKLIN PARK, ILL.—Kaiser-Frazer Corp. is planning to have built a $4 million parts and accessories depot which will be its central distributing point. Plant will be leased on a long-term basis from Wilbur E. Howett Co., Chicago, mortgage banker; Albert Eiseman Jr. Inc., Chicago, is architect; and Edwin E. Hartrich & Son, Chicago, contractor.

NEW YORK

BUFFALO—Twin Coach Co., John K. Lee, vice president and general manager, Kent, O., is retooling to make airplane parts after completing one hundred and twenty more busses here, but will continue to supply the local and Canadian units with fabricated bus parts.

OHIO

BREWSTER, O.—Wheeling & Lake Erie Railway, W. L. Peoples, engineer of Maintenance and Ways and Structure, is planning to build a $125,000 electrical shop and a $100,000 railroad yard office building; Ward & Conrad, Swetland Bldg., Cleveland, architects.

CINCINNATI — Cincinnati Metalcrafts Inc., C. L. Harrison, president, Oakley, has purchased real estate and other assets of Steel Materials Corp., Oakley.

CINCINNATI—International Molders & Foundry Workers' Union of North America, Chester A. Sample, president, plans to construct a $200,000 headquarters building.

CLEVELAND—Grand Enameling Co., 2335 E. 67 St., formerly the Enameling Division of Grand Industries Inc. has been incorporated.

CLEVELAND—Alloys & Chemicals Co. Inc., N. L. Butkin, president, 703 N.B.C. Building, has been formed to deal in heavy industrial chemicals.

CLEVELAND—Lucas Machine Tool Co., 12302 Kirby Ave., has been purchased by New Britain Machine Co., R. S. Howe, vice president, New Britain, Conn.

CLEVELAND—Sprayon Inc., Donald D. Menhenett, president, 1360 W. Ninth St., with temporary offices in the Marion Bldg., has been incorporated to manufacture and distribute on a national scale several products in the protective coating field.

CLEVELAND—Reilly Tar & Chemical Co., Merchandise Bldg., Indianapolis, is planning to construct a naphthalene building in which

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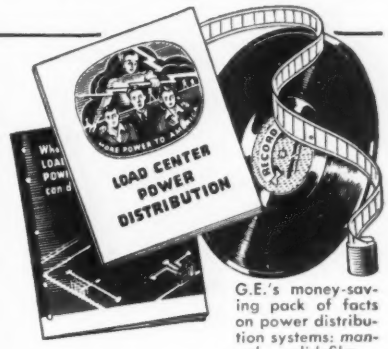

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GENERAL ELECTRIC

naphthalene processing equipment will be installed at its plant at 3201 Independence Rd.

HURON, O.—Wheeling & Lake Erie Railroad Co. is considering installing two new electric Hewlitt machines for the unloading of iron ore.

SANDUSKY, O.—Philco Radio Corp., Tioga & C Sts., Philadelphia, has awarded separate contracts totaling $1 million for the construction of a factory and warehouse; H. E. Childers, 408½ Croghan St., Fremont, architect.

PENNSYLVANIA

EDDYSTONE, PA.—Vanadium Corp. of America, Niagara Falls, N. Y., has awarded a $100,000 contract to Hadley Contracting & Construction Co., 1213 Wood St., Philadelphia, for factory and office renovations.

ELLWOOD CITY, PA.—Borg-Warner Corp., Ingersoll Steel Division, has purchased the plant of the United Tube Corp. on Franklin Ave. to manufacture hot air gas-fired furnaces, but first will convert and modernize it.

ERIE, PA.—General Electric Co. has awarded a general contract for the construction of a refrigerator warehouse at its Erie works, total cost, including equipment, to be $4 million, under the supervision of GE Realty Corp., Frank D. Carey, resident engineer.

PITTSBURGH—H. J. Heinz Co., H. J. Heinz II, president, is planning a $15 million building program which calls for extensive changes in existing structures and the erection of four new buildings. Skidmore, Owings and Merrill, New York, architects.

PITTSBURGH—Hagel Electric Corp. is being chartered to establish and operate a plant for the manufacture and distribution of electrical appliances and equipment by Neal Hagel, C. Donovan and Ann N. Hagel; Ernest G. Nassar, 305 Fifth-Grant Bldg., representative.

RHODE ISLAND

PROVIDENCE, R. I.—Narragansett Electric Co., 460 Eddy St., has awarded a $115,000 contract to United Engineers & Constructors Inc., 1401 Arch St., Philadelphia, for the design and construction of an oil pump house, junction building and braker unit for coal conveyor.

TEXAS

HOUSTON, TEX.—Transcontinental Pipe Line Co. has awarded a $200 million contract to Ray Fish Engineer Corp. to build the longest pipeline in the world from near McAllen, Texas in the Rio Grand Valley to New York city.

SAN ANTONIO, TEX.—United Gas Corp., W. W. Clopton, district manager, White Rd., plans to build a $2 million 19-mile gas pipeline.

WASHINGTON

SEATTLE, WASH.—U. S. Alaska district engineer, Col. W. E. Potter, is planning the second group in the $65 million Alaska military construction program which involves warehouses at Whittier and Fort Richardson and family and officers' quarters.

TACOMA, WASH.—American Smelting & Refining Co. has received a permit from the city for the construction of a $300,000 sulphuric acid building.

CANADA

QUEBEC CITY, QUE.—International Harvester Co. of Canada Ltd., Hamilton, Ont., plans to build a $500,000 assembly and distribution plant; Ross & Associates, Dominion Square Bldg., Montreal, architects; C. E. Blackburn, c/o owner, chief engineer.

PRICES OF LEADING FERROALLOYS PRODUCTS

(*Continued from Page* 131)

packed 12.1c, ton lot 13.55c, less ton 15.2c. Delivered. Spot, add 1.25c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.0c per lb of contained Si, carload packed 14.3c, ton lot 15.45c, less ton 16.7c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.) Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe.). C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump per lb cl 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c, smaller lots 8.65c; or, lump, carload, bulk, 8.40c per lb of alloy, packed c.l. 9.20c, ton lots 9.30c, 200 to 1000 lb 9.65c, less 200 lb 10.15c per lb of alloy. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.00c per lb of briquet, c.l. packaged 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.0c, per lb of briquet, c.l. packed 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.65c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 5.75c per lb of briquet, c.l. packed 6.55c, ton lot 7.35c, less ton 8.25c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 5.90c, c.l. packed 6.70c, ton lots 7.50c, less ton 8.40c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 80.00c per pound of Mo contained. f.o.b. Langeloth, Pa.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.). Contract, ton lots, 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.28, less ton $1.35. F.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon (Ti 15-18%, C 6-8%). Contract, $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21% C 3-4.5%). Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 3.25-4% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, f.o.b. Bridgeville, Pa. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all f.o.b. Bridgeville, Pa., usual freight allowance.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more. 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max. Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.75 per lb of contained Cb, less ton $2.80. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload, packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.25c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 16.50-17.00c per lb of alloy; ton lots 17.90-18.00c; less ton lots 19.40-19.50, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; tons lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 11c, ton lots 11.25c, smaller lots 11.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base): Gross tons per carload, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c. Effective Jan. 1, 1949, price will be $1.10 Langeloth.

Technical Molybdic-Oxide: Per lb, contained Mo, f.o.b. Langeloth, Pa., packed in bags containing 20 lb of molybdenum, 80.00c.